

**G0.0+0.0**

Sgr A East

**RA:** 17<sup>h</sup>45<sup>m</sup>44<sup>s</sup>  
**Dec:** –29°00′

**1-GHz flux/Jy:** 100?  
**Spectral index:** 0.8?

**Size/arcmin:** 3.5×2.5  
**Type:** S

**Radio:** Non-thermal shell, in complex region, interacting with molecular material to the west.

**X-ray:** Diffuse emission, centrally peaked.

**Point sources:** Compact X-ray/radio source.

**References:**

Ekers *et al.* 1983, A&A, 122, 143. VLA at 1.4 GHz and 5 GHz (both 5''×8'').  $S_{1.4\text{ GHz}} = 77\text{ Jy}$ ,  $S_{5.0\text{ GHz}} = 31\text{ Jy}$ .  
 Pedlar *et al.* 1989, ApJ, 342, 769. VLA at 332 MHz (12''), 1.4 GHz (1''3×2''5) and 5 GHz (1''3×2''5).  
 Mezger *et al.* 1989, A&A, 209, 337. Nearby molecular material.  
 Ho *et al.* 1991, Nature, 350, 309. VLA of NH<sub>3</sub> emission from surroundings.  
 Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz (17''×33'').  
 Serabyn *et al.* 1992, ApJ, 395, 166. Nearby molecular material.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43''×88'').  
 Yusef-Zadeh & Mehringer 1995, ApJ, 452, L37. VLA of nearby H<sub>2</sub>O masers.  
 Yusef-Zadeh *et al.* 1999, ApJ, 512, 230. OH maser observations.  
 Coil & Ho 2000, ApJ, 533, 245. NH<sub>3</sub> observations of surroundings.  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz (24''×43'').  
 Fatuzzo *et al.* 2001, ApJ, 549, 293. Electron–positron lines from the vicinity.  
 Yusef-Zadeh *et al.* 2001, ApJ, 560, 749. Observations of nearby molecular hydrogen.

Maeda *et al.* 2002, ApJ, 570, 671. Chandra observations.  
 Sakano *et al.* 2003, AN, 324 (No S1), 197. XMM observations.  
 Roy & Rao 2004, MNRAS, 349, L25. GMRT at 620 MHz (6'.6×11'.4).  
 Sakano *et al.* 2004, MNRAS, 350, 129. XMM observations.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (1''×2''2).  
 Park *et al.* 2005, ApJ, 631, 964. Chandra observations.  
 Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray detection.  
 Koyama *et al.* 2007, PASJ, 59, S237. Suzaku observations.  
 Lee *et al.* 2008, ApJ, 674, 247. Molecular H<sub>2</sub> observations of surroundings.  
 Sjouwerman & Pihlström 2008, ApJ, 681, 1287. VLA at 1.7 GHz of OH masers.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Tsuboi *et al.* 2012, PASJ, 64, 111. CO observations of SW.  
 Minh *et al.* 2013, ApJ, 773, 31. NH<sub>3</sub> observations of region.  
 Zhao *et al.* 2013, ApJ, 777, 146. VLA at 4.8 GHz (0''5×0''7), 5.5 GHz (0''6×1''6), and 8.3 GHz (1''0×2''0).  
 Nynka *et al.* 2013, ApJ, 778, L31. NuSTAR of compact X-ray source.

**G0.3+0.0**

**RA:** 17<sup>h</sup>46<sup>m</sup>15<sup>s</sup>  
**Dec:** –28°38′

**1-GHz flux/Jy:** 22  
**Spectral index:** 0.6

**Size/arcmin:** 15×8  
**Type:** S

Has been called G0.33+0.04 and G0.4+0.1.

**Radio:** Bilateral shell, near Galactic Centre.

**References:**

Kassim & Frail 1996, MNRAS, 283, L51. VLA at 333 MHz (23''×42''), plus review of flux densities and other observations.

LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz (30'').  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (30'').

**G0.9+0.1**

**RA:** 17<sup>h</sup>47<sup>m</sup>21<sup>s</sup>  
**Dec:** –28°09′

**1-GHz flux/Jy:** 18?  
**Spectral index:** varies

**Size/arcmin:** 8  
**Type:** C

**Radio:** Flat spectrum core within steep spectrum shell.

**X-ray:** Central core, with non-thermal spectrum.

**Point sources:** Central pulsar.

**References:**

Helfand & Becker 1987, ApJ, 314, 203. VLA at 1.4 and 5 GHz, and Einstein observations.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43''×91'').  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Mereghetti *et al.* 1998, A&A, 331, L77. X-ray detection.  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz (43''×24'').  
 Sidoli *et al.* 2000, A&A, 361, 719. BeppoSAX observations.  
 Gaensler *et al.* 2001, ApJ, 556, L107. Chandra observations.

Porquet *et al.* 2003, A&A, 401, 197. XMM observations.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (8''6×11''3).  
 Aharonian *et al.* 2005, A&A, 432, L25.  $\gamma$ -ray detection.  
 Dubner *et al.* 2008, A&A, 487, 1033. ATCA and VLA at 1.4 GHz (1''2×2''5 :  $S = 8.3 \pm 0.7\text{ Jy}$ ), 5 GHz (1''6×2''5) and 8.3 GHz (0''8×1''5).  
 Camilo *et al.* 2009, ApJ, 700, L34. Pulsar detection.  
 Holler *et al.* 2012, A&A, 539, A24. Chandra and XMM observations.

**G1.0–0.1**

**RA:** 17<sup>h</sup>48<sup>m</sup>30<sup>s</sup>  
**Dec:** –28°09′

**1-GHz flux/Jy:** 15  
**Spectral index:** 0.6?

**Size/arcmin:** 8  
**Type:** S

Has been called G1.05–0.1 and G1.05–0.15.

**Radio:** Incomplete shell, to the S of Sgr D.

**X-ray:** Possibly detected.

**References:**

Downes *et al.* 1979, A&AS, 35, 1. Review of flux densities.  
 Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz (64″×100″:  $S=12.3$  Jy).  
 Liszt 1992, ApJS, 82, 495. VLA at 1.6 GHz (13″×23″).  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×91″).  
 Mehringer *et al.* 1998, ApJ, 493, 274. VLA at 1.6 GHz (15″×28″) and 5 GHz, including masers observations.  
 Yusef-Zadeh *et al.* 1999, ApJ, 527, 172. VLA of nearby OH masers.  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz

(43″×24″).  
 Sidoli *et al.* 2001, A&A, 372, 651. BeppoSAX possible detection.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (30″).  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Nobukawa *et al.* 2009, AdSpR, 43, 1045. Suzaku observations.  
 Marquez-Lopez & Phillips 2010, MNRAS, 407, 94. Mid-IR observations.

**G1.4–0.1**

**RA:** 17<sup>h</sup>49<sup>m</sup>39<sup>s</sup>  
**Dec:** –27°46′

**1-GHz flux/Jy:** ??  
**Spectral index:** ?

**Size/arcmin:** 10  
**Type:** S

**Radio:** Shell, brightest in E.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×92″:  $S=2$  Jy).  
 Yusef-Zadeh *et al.* 1999, ApJ, 527, 172. VLA of nearby OH masers.  
 Bhatnagar 2002, MNRAS, 332, 1. GMRT at 327 MHz

(2′7×2′4:  $S=4.2±0.5$ ).  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (8″2×12″2).  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.

**G1.9+0.3**

**RA:** 17<sup>h</sup>48<sup>m</sup>45<sup>s</sup>  
**Dec:** –27°10′

**1-GHz flux/Jy:** 0.6  
**Spectral index:** 0.6

**Size/arcmin:** 1.5  
**Type:** S

**Radio:** Shell, brighter to the N, brightening.

**X-ray:** Shell, with bright limbs to E and W.

**References:**

Green & Gull 1984, Nature, 312, 527. VLA at 5 GHz (4″4×2″).  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×94″).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (8″3×12″).  
 Nord *et al.* 2004, AJ, 128, 1646. VLA at 330 MHz (7″×12″).  
 Green 2004, BASI, 32, 335. VLA at 1.5 GHz (7″2×9″4).  
 Reynolds *et al.* 2008, ApJ, 680, L41. Chandra observations.  
 Green *et al.* 2008, MNRAS, 387, L54. VLA at 4.86 GHz

(4″×10″), for expansion studies.  
 Murphy *et al.* 2008, MNRAS, 389, L23. MOST at 843 MHz for flux increase.  
 Gómez & Rodríguez 2009, RMxAA, 45, 91. VLA at 1.5 GHz (5″1×10″6).  
 Reynolds *et al.* 2009, ApJ, 695, L149. Chandra spectroscopy.  
 Borkowski *et al.* 2010, ApJ, 724, L161. Chandra observations.  
 Carlton *et al.* 2011, ApJ, 737, L22. Chandra expansion studies.  
 Borkowski *et al.* 2013, ApJ, 771, L9. Chandra observations.

**G3.7–0.2**

**RA:** 17<sup>h</sup>55<sup>m</sup>26<sup>s</sup>  
**Dec:** –25°50′

**1-GHz flux/Jy:** 2.3  
**Spectral index:** 0.65

**Size/arcmin:** 14×11  
**Type:** S

Has been called G003.8–00.3.

**Radio:** Double arc.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×99″ :  
 $S=2.4$  Jy).  
 Gaensler 1998, ApJ, 493, 781. VLA at 1.4 GHz (9″×15″ :  $S=$

1.7±0.1 Jy).  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz  
 (8″4×11″4).

**G3.8+0.3**

**RA:** 17<sup>h</sup>52<sup>m</sup>55<sup>s</sup>  
**Dec:** –25°28′

**1-GHz flux/Jy:** 3?  
**Spectral index:** 0.6

**Size/arcmin:** 18  
**Type:** S?

**Radio:** Incomplete shell.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×100″ :  
 $S=3.5$  Jy).  
 Bhatnagar 2002, MNRAS, 332, 1. GMRT at 327 MHz  
 (27″×17″ :  $S=6.0±0.4$ ).

**G4.2–3.5**

**RA:** 18<sup>h</sup>08<sup>m</sup>55<sup>s</sup>  
**Dec:** –27°03′

**1-GHz flux/Jy:** 3.2?  
**Spectral index:** 0.6?

**Size/arcmin:** 28  
**Type:** S

**Radio:** Elongated shell.

**Optical:** Detected.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz  
 (4.3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G4.5+6.8**

**RA:** 17<sup>h</sup>30<sup>m</sup>42<sup>s</sup>  
**Dec:** –21°29′

**1-GHz flux/Jy:** 19  
**Spectral index:** 0.64

Kepler, SN1604, 3C358

**Size/arcmin:** 3  
**Type:** S

This is the remnant of Kepler’s SN of AD1604.

**Radio:** Incomplete shell, brighter to the N.

**Optical:** Faint filaments.

**X-ray:** Shell, brighter to the N.

**Distance:** Optical expansion and proper motion indicates about 2.9 kpc, HI observations suggest 3.4 to 6.4 kpc.

**References:**

van den Bergh & Kamper 1977, ApJ, 218, 617. Optical proper motions.  
 Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.  
 White & Long 1983, ApJ, 264, 196. Einstein observations.  
 Matsui *et al.* 1984, ApJ, 287, 295. VLA at 1.4 (2<sup>h</sup>5×3<sup>h</sup>2) and 5 GHz (3<sup>h</sup>2×4<sup>h</sup>8) and Einstein image (5<sup>h</sup>).  
 Dickel *et al.* 1988, ApJ, 330, 254. VLA at 1.4 (1<sup>h</sup>2×2<sup>h</sup>3) and 5 GHz (0<sup>h</sup>6×1<sup>h</sup>0) at two epochs.  
 Smith *et al.* 1989, ApJ, 347, 925. EXOSAT observations.  
 Hatsukade *et al.* 1990, PASJ, 42, 279. X-ray spectrum.  
 Blair *et al.* 1991, ApJ, 366, 484. Optical imaging and spectroscopy.  
 Bandiera & van den Bergh 1991, ApJ, 374, 186. Optical changes.  
 van den Bergh 1991, PASP, 103, 194. Optical imaging.  
 Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Hughes 1999, ApJ, 527, 298. ROSAT and Einstein image comparison for expansion studies.  
 Reynoso & Goss 1999, AJ, 118, 926. VLA at 1.4 GHz (23<sup>h</sup>×13<sup>h</sup>) for HI studies.  
 Kinugasa & Tsunemi 1999, PASJ, 51, 239. ASCA observations.  
 Gerardy & Fesen 2001, AJ, 121, 2781. IR spectroscopy and imaging.

DeLaney *et al.* 2002, ApJ, 580, 914. VLA at 1.3 to 1.5 GHz and 5 GHz (7<sup>h</sup>2) for spectral index studies.  
 Morgan *et al.* 2003, ApJ, 597, L33. Sub-mm dust observations.  
 Sollerman *et al.* 2003, A&A, 407, 249. Optical spectroscopy.  
 Cassam-Chenaï *et al.* 2004, A&A, 414, 545. XMM observations.  
 Bamba *et al.* 2005, ApJ, 621, 793. Chandra observations of rim.  
 Riesgo & López 2005, RMxAA, 41, 57. Optical observations of filament (previously classified as PN, H 2-12).  
 Blair *et al.* 2007, ApJ, 662, 998. Spitzer observations.  
 Reynolds *et al.* 2007, ApJ, 668, L135. Chandra observations.  
 Sankrit *et al.* 2008, AJ, 135, 538. HST observations.  
 Aharonian *et al.* 2008, A&A, 488, 219.  $\gamma$ -ray upper limit.  
 Enomoto *et al.* 2008, ApJ, 683, 383.  $\gamma$ -ray upper limit.  
 Katsuda *et al.* 2008, ApJ, 689, 225. Chandra proper motion studies.  
 Vink *et al.* 2008, ApJ, 689, 231. Chandra proper motion studies.  
 Gomez *et al.* 2012, MNRAS, 420, 3557. Herschel IR dust observations.  
 Williams *et al.* 2012, ApJ, 755, 3. Spitzer spectroscopy.  
 Burkey *et al.* 2013, ApJ, 764, 63. Chandra observations.  
 Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.  
 Park *et al.* 2013, ApJ, 767, L10. Suzaku observations.

**G4.8+6.2**

**RA:** 17<sup>h</sup>33<sup>m</sup>25<sup>s</sup>  
**Dec:** –21°34′

**1-GHz flux/Jy:** 3  
**Spectral index:** 0.6

**Size/arcmin:** 18  
**Type:** S

Has been called G4.5+6.2.

**Radio:** Faint shell.

**References:**

Duncan *et al.* 1995, MNRAS, 277, 36. Parkes 64-m at 2.4-GHz (10<sup>h</sup>4).  
 Bhatnagar 2000, MNRAS, 317, 453. GMRT at 327 MHz (2<sup>h</sup>2×1<sup>h</sup>3 : S=5.5±1.2 Jy), and NVSS at 1.4 GHz.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G5.2–2.6**

**RA:** 18<sup>h</sup>07<sup>m</sup>30<sup>s</sup>  
**Dec:** –25°45′

**1-GHz flux/Jy:** 2.6?  
**Spectral index:** 0.6?

**Size/arcmin:** 18  
**Type:** S

**Radio:** Poorly resolved shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4<sup>h</sup>3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G5.4–1.2**

**RA:** 18<sup>h</sup>02<sup>m</sup>10<sup>s</sup>  
**Dec:** –24°54′

**1-GHz flux/Jy:** 35?  
**Spectral index:** 0.2?

**Milne 56**  
**Size/arcmin:** 35  
**Type:** C?

Part been called G5.3–1.0. Has been suggested that this is not a SNR.

**Radio:** Incomplete shell, including wide ‘v’ of emission to east with small flat-spectrum source at apex.

**Optical:** Detected.

**X-ray:** Pulsar detected, with faint extension.

**Point sources:** Pulsar nearby, in flat spectrum source.

**Distance:** H<sub>I</sub> absorption suggests > 4.3 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ :  $S = 38$  Jy).  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4) and 5 GHz (4′4).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′8 :  $S = 21.9 \pm 2.4$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical detection.  
 Becker & Helfand 1985, Nature, 313, 115. VLA at 1.4 and 5 GHz.  
 Helfand & Becker 1985, Nature, 313, 118. Suggesting it is not a SNR.  
 Manchester *et al.* 1985, MNRAS, 212, 975. Pulsar detection.  
 Caswell *et al.* 1987, MNRAS, 225, 329. MOST at 843 MHz (42″ × 110″).  
 Frail & Kulkarni 1991, Nature, 352, 785. Pulsar and remnant association.  
 Manchester *et al.* 1991, MNRAS, 253, 7P. Pulsar and remnant association.  
 Milne *et al.* 1992, MNRAS, 255, 707. Parkes 64-m at 4.75 (4′5 :

$S = 30.8 \pm 2.1$  Jy) and 8.4 GHz (3′ :  $S = 24 \pm 3$  Jy), including polarisation.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′0 × 4′9 :  $S = 38$  Jy).  
 Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz (68″ × 73″), plus H<sub>I</sub> absorption.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gaensler & Frail 2000, Nature, 406, 158. Pulsar observations, including proper motion.  
 Kaspi *et al.* 2001, ApJ, 562, L163. X-ray detection of pulsar, and upper limit for remnant.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 10.6 GHz, including polarisation.  
 Blazek *et al.* 2006, ApJ, 652, 1523. Proper motion study of pulsar.  
 Zeiger *et al.* 2008, ApJ, 674, 271. Proper motion study of pulsar.  
 Liszt *et al.* 2009, A&A, 508, 1331. CO and IR observations of region.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser detection.

**G5.5+0.3**

**RA:** 17<sup>h</sup>57<sup>m</sup>04<sup>s</sup>  
**Dec:** –24°00′

**1-GHz flux/Jy:** 5.5  
**Spectral index:** 0.7

**Size/arcmin:** 15 × 12  
**Type:** S

Has been called G5.55+0.32.

**Radio:** Shell.

**Optical:** Detected.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 14.3 \pm 0.3$  Jy), plus other observations.  
 Liszt *et al.* 2009, A&A, 508, 1331. CO and IR observations of

region.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G5.9+3.1**

**RA:** 17<sup>h</sup>47<sup>m</sup>20<sup>s</sup>  
**Dec:** –22°16′

**1-GHz flux/Jy:** 3.3?  
**Spectral index:** 0.4?

**Size/arcmin:** 20  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Effelsberg 100-m at 2.7 GHz (4′3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G6.1+0.5**

**RA:** 17<sup>h</sup>57<sup>m</sup>29<sup>s</sup>  
**Dec:** –23°25′

**1-GHz flux/Jy:** 4.5  
**Spectral index:** 0.9

**Size/arcmin:** 18×12  
**Type:** S

Has been called G6.10+0.53.

**Radio:** Partial shell.

**Optical:** Detected.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 13.4 \pm 0.2$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G6.1+1.2**

**RA:** 17<sup>h</sup>54<sup>m</sup>55<sup>s</sup>  
**Dec:** –23°05′

**1-GHz flux/Jy:** 4.0?  
**Spectral index:** 0.3?

**Size/arcmin:** 30×26  
**Type:** F

Has been called G6.1+1.15.

**Radio:** Faint, diffuse emission.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4′.3), including polarisation.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G6.4–0.1**

W28

**RA:** 18<sup>h</sup>00<sup>m</sup>30<sup>s</sup>  
**Dec:** –23°26′

**1-GHz flux/Jy:** 310  
**Spectral index:** varies

**Size/arcmin:** 48  
**Type:** C

Has been called G6.6–0.2.

**Radio:** Several non-thermal sources in a ring, with flat spectrum core.

**Optical:** Diffuse emission.

**X-ray:** Diffuse emission from most of the remnant.

**Point sources:** Young pulsar near edge of remnant, but not thought to be related.

**Distance:** HI observations suggest 1.9 kpc.

**References:**

Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10 GHz (3′).  
 van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).  
 Dopita *et al.* 1977, ApJ, 214, 179. Some optical line ratios.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Andrews *et al.* 1983, ApJ, 266, 684. VLA at 1.4 GHz (8′′) 4.9 GHz (3′′) and 15 GHz (1′′) of central region only, plus Einstein image of central region.  
 Bohigas *et al.* 1983, RMxAA, 8, 155. Optical spectra.  
 Odenwald *et al.* 1984, ApJ, 279, 162. Nearby IR source.  
 Andrews *et al.* 1985, AJ, 90, 310. VLA of central component.  
 Long *et al.* 1991, ApJ, 373, 567. Einstein and optical observations.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.1×4′.4 : S = 660 Jy).  
 Kaspi *et al.* 1993, ApJ, 409, L57. Pulsar association.  
 Frail *et al.* 1993, Nature, 365, 136. VLA at 327 MHz (smoothed to 65′′), plus pulsar association.  
 Frail *et al.* 1994, ApJ, 424, L111. VLA of associated OH masers.  
 Esposito *et al.* 1996, ApJ, 461, 820. Possible associated  $\gamma$ -ray emission.  
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Claussen *et al.* 1997, ApJ, 489, 143. VLA of OH masers.  
 Claussen *et al.* 1999, ApJ, 522, 349. High resolution observations of OH masers.  
 Arikawa *et al.* 1999, PASJ, 51, L7. Observations of shocked CO.  
 Yusef-Zadeh *et al.* 2000, ApJ, 540, 842. VLA at 327 MHz (2′.6×5′.5) and 1.48 GHz (40′′×65′′).  
 Dubner *et al.* 2000, AJ, 120, 1933. VLA at 328 MHz (97′′×52′′ : S = 425±40 Jy) and 1415 MHz (88′′×48′′ : S = 246±20 Jy), and comparison with other observations.  
 Reach & Rho 2000, ApJ, 544, 843. ISO observations of interactions with surroundings.

see also: Reach & Rho 2001, ApJ, 558, 943. Erratum.  
 Rowell *et al.* 2000, A&A, 359, 337. Upper limit on high energy  $\gamma$ -rays.  
 Douvion *et al.* 2001, A&A, 373, 281. ISO observations.  
 Roberts *et al.* 2001, ApJS, 133, 451. ASCA observations.  
 Velázquez *et al.* 2002, AJ, 124, 2145. Parkes 64-m at 1.4 GHz (15′) for HI.  
 Rho & Borkowski 2002, ApJ, 575, 201. ROSAT and ASCA observations.  
 Claussen *et al.* 2002, ApJ, 580, 909. Observations of nearby source.  
 Yusef-Zadeh *et al.* 2003, ApJ, 583, 267. OH observations.  
 Caswell 2004, MNRAS, 349, 99. ATCA at 1.7 GHz of associated OH masers.  
 Mavromatakis *et al.* 2004, A&A, 426, 567. Optical observations.  
 Reach *et al.* 2005, ApJ, 618, 297. Molecular lines and near IR observations.  
 Hoffman *et al.* 2005, ApJ, 620, 257. OH maser observations.  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Neufeld *et al.* 2007, ApJ, 664, 890. Spitzer observations.  
 Aharonian *et al.* 2008, A&A, 481, 401.  $\gamma$ -ray observations.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Guilani *et al.* 2010, A&A, 516, L11.  $\gamma$ -ray observations.  
 Marquez-Lopez & Phillips 2010, MNRAS, 407, 94. Mid-IR observations.  
 Abdo *et al.* 2010, ApJ, 718, 348. Fermi observations.  
 Yuan & Neufeld 2011, ApJ, 726, 76. Spitzer observations.  
 Sawada *et al.* 2012, PASJ, 64, 81. Suzaku observations.  
 Nichols *et al.* 2012, MNRAS, 419, 251. CO observations of selected regions.  
 Gusdorf *et al.* 2012, A&A, 542, L19. CO observations of regions in NE.

**G6.4+4.0**

**RA:** 17<sup>h</sup>45<sup>m</sup>10<sup>s</sup>  
**Dec:** –21°22′

**1-GHz flux/Jy:** 1.3?  
**Spectral index:** 0.4?

**Size/arcmin:** 31  
**Type:** S

**Radio:** Faint asymmetric shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Effelsberg 100-m at 2.7 GHz (4′.3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G6.5–0.4**

**RA:** 18<sup>h</sup>02<sup>m</sup>11<sup>s</sup>  
**Dec:** –23°34′

**1-GHz flux/Jy:** 27  
**Spectral index:** 0.6

**Size/arcmin:** 18  
**Type:** S

Has been called G6.51–0.48, and part has been called G6.67–0.42.

**Radio:** Shell, overlapping G6.4–0.1.

**Optical:** Detected.

**References:**

Yusef-Zadeh *et al.* 2000, ApJ, 540, 842. VLA at 330 MHz (2′6×5′5) and 1.4 GHz (0′7×1′1).  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 60.8 \pm 0.4$  Jy), plus other observations.

Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G7.0–0.1**

**RA:** 18<sup>h</sup>01<sup>m</sup>50<sup>s</sup>  
**Dec:** –22°54′

**1-GHz flux/Jy:** 2.5?  
**Spectral index:** 0.5?

**Size/arcmin:** 15  
**Type:** S

Has been called G7.06–0.12.

**Radio:** Double rim, brightest in W, confused by bright HII region M20 in SE.

**References:**

Yusef-Zadeh *et al.* 2000, ApJ, 540, 842. VLA at 327 MHz (2′6×5′5) and 1.48 GHz (40″×65″).  
 Dubner *et al.* 2000, AJ, 120, 1933. VLA at 328 MHz (97″×52″) and 1415 MHz (88″×48″).

**G7.2+0.2**

**RA:** 18<sup>h</sup>01<sup>m</sup>07<sup>s</sup>  
**Dec:** –22°38′

**1-GHz flux/Jy:** 2.8  
**Spectral index:** 0.6

**Size/arcmin:** 12  
**Type:** S

Has been called G7.20+0.20.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 5.2 \pm 0.2$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G7.7–3.7**

**RA:** 18<sup>h</sup>17<sup>m</sup>25<sup>s</sup>  
**Dec:** –24°04′

**1-GHz flux/Jy:** 11  
**Spectral index:** 0.32

**Size/arcmin:** 22  
**Type:** S

1814–24

**Radio:** Shell, with high polarisation.

**References:**

Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4) and 5 GHz (4′4).  
 Milne *et al.* 1986, MNRAS, 223, 487. MOST at 843 MHz (44″×108″) and Parkes 64-m at 8.4 GHz (3′ :  $S = 4.6 \pm 0.5$  Jy),

with polarisation, plus review of flux densities.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (70″×35″ :  $S = 9.9 \pm 0.1$  Jy), including polarisation.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.



**G8.3–0.0**

**RA:** 18<sup>h</sup>04<sup>m</sup>34<sup>s</sup>  
**Dec:** –21°49′

**1-GHz flux/Jy:** 1.2  
**Spectral index:** 0.6

**Size/arcmin:** 5×4  
**Type:** S

Has been called G8.31–0.09.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 2.3 \pm 0.1$  Jy), plus other observations.  
 Higashi *et al.* 2008, ApJ, 683, 957.  $\gamma$ -ray detection.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G8.7–5.0**

**RA:** 18<sup>h</sup>24<sup>m</sup>10<sup>s</sup>  
**Dec:** –23°48′

**1-GHz flux/Jy:** 4.4  
**Spectral index:** 0.3

**Size/arcmin:** 26  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4.3).  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G8.7–0.1**

**RA:** 18<sup>h</sup>05<sup>m</sup>30<sup>s</sup>  
**Dec:** –21°26′

**1-GHz flux/Jy:** 80  
**Spectral index:** 0.5

**Size/arcmin:** 45  
**Type:** S?

(W30)

Has been called G8.6–0.1.

**Radio:** Clumpy non-thermal shell, with low-frequency turnover.

**X-ray:** Northern edge detected.

**Point sources:** Pulsar inside western edge.

**References:**

Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (7.2×9.7 :  $S = 190 \pm 50$  Jy).  
 Kassim & Weiler 1990, Nature, 343, 146. VLA at 327 MHz (3.0×3.7).  
 Kassim & Weiler 1990, ApJ, 360, 184. VLA at 327 MHz (2.8×4.1 :  $S = 129 \pm 11$  Jy), and part at 1.4 GHz (0.9×1.8), plus review of flux densities.  
 Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz (37″×55″).  
 Finley & Ögelman 1994, ApJ, 434, L25. ROSAT observations,

including pulsar.  
 Aharonian *et al.* 2005, Science, 307, 1938.  $\gamma$ -ray detection.  
 Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray observations.  
 Landi *et al.* 2006, ApJ, 651, 190. X-ray observations.  
 Briskin *et al.* 2006, ApJ, 652, 554. Pulsar proper motion.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser detection.  
 Castro & Slane 2010, ApJ, 717, 372. Fermi observations.  
 Ajello *et al.* 2012, ApJ, 744, 80. Fermi observations.

**G8.9+0.4**

**RA:** 18<sup>h</sup>03<sup>m</sup>58<sup>s</sup>  
**Dec:** –21°03′

**1-GHz flux/Jy:** 9  
**Spectral index:** 0.6

**Size/arcmin:** 24  
**Type:** S

Has been called G8.90+0.40.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 18.2 \pm 0.5$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G9.7–0.0**

**RA:** 18<sup>h</sup>07<sup>m</sup>22<sup>s</sup>  
**Dec:** –20°35′

**1-GHz flux/Jy:** 3.7  
**Spectral index:** 0.6

**Size/arcmin:** 15×11  
**Type:** S

Has been called G9.7–0.1 and G9.70–0.06.

**Radio:** Shell.

**References:**

Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 6.5 \pm 0.2$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser detection.

**G9.8+0.6**

**RA:** 18<sup>h</sup>05<sup>m</sup>08<sup>s</sup>  
**Dec:** –20°14′

**1-GHz flux/Jy:** 3.9  
**Spectral index:** 0.5

**Size/arcmin:** 12  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Caswell 1983, MNRAS, 204, 833. Molonglo at 408 MHz (3′ :  $S = 5.8 \pm 0.6$  Jy).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz

(41″×63″ :  $S = 3.5 \pm 0.4$  Jy).  
 Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G9.9–0.8**

**RA:** 18<sup>h</sup>10<sup>m</sup>41<sup>s</sup>  
**Dec:** –20°43′

**1-GHz flux/Jy:** 6.7  
**Spectral index:** 0.4

**Size/arcmin:** 12  
**Type:** S

Has been called G9.95–0.81.

**Radio:** Shell.

**Optical:** Detected.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 11.0 \pm 0.3$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G10.5–0.0**

**RA:** 18<sup>h</sup>09<sup>m</sup>08<sup>s</sup>  
**Dec:** –19°47′

**1-GHz flux/Jy:** 0.9  
**Spectral index:** 0.6

**Size/arcmin:** 6  
**Type:** S

Has been called G10.59–0.04.

**Radio:** Partial shell.

**X-ray:** Detected.

**References:**

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 1.4 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G11.0–0.0**

**RA:** 18<sup>h</sup>10<sup>m</sup>04<sup>s</sup>  
**Dec:** –19°25′

**1-GHz flux/Jy:** 1.3  
**Spectral index:** 0.6

**Size/arcmin:** 11×9  
**Type:** S

Has been called G11.0+0.0 and G11.03–0.05.

**Radio:** Partial shell.

**X-ray:** Diffuse emission.

**References:**

Bamba *et al.* 2003, ApJ, 589, 253. ASCA observations.  
 Brogan *et al.* 2004, AJ, 127, 355. VLA at 330 MHz (25"),  
 1.5 GHz (25"), and 74 MHz.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42" :  $S = 3.1 \pm 0.2$  Jy), plus other observations.

**G11.1–1.0**

**RA:** 18<sup>h</sup>14<sup>m</sup>03<sup>s</sup>  
**Dec:** –19°46′

**1-GHz flux/Jy:** 5.8  
**Spectral index:** 0.5

**Size/arcmin:** 18×12  
**Type:** S

Has been called G11.2–1.1 and G11.17–1.04.

**Radio:** Shell.

**Optical:** Detected.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42" :  $S = 11.0 \pm 0.3$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 :  $S = 3.40 \pm 0.25$  Jy) including polarisation and review of flux densities.

**G11.1–0.7**

**RA:** 18<sup>h</sup>12<sup>m</sup>46<sup>s</sup>  
**Dec:** –19°38′

**1-GHz flux/Jy:** 1.0  
**Spectral index:** 0.7

**Size/arcmin:** 11×7  
**Type:** S

Has been called G11.15–0.71.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2004, AJ, 127, 355. VLA at 330 MHz (25"),  
 1.5 GHz (25"), and 74 MHz.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42" :  $S = 2.3 \pm 0.1$  Jy), plus other observations.

**G11.1+0.1**

**RA:** 18<sup>h</sup>09<sup>m</sup>47<sup>s</sup>  
**Dec:** –19°12′

**1-GHz flux/Jy:** 2.3  
**Spectral index:** 0.4

**Size/arcmin:** 12×10  
**Type:** S

Has been called G11.18+0.11.

**Radio:** Shell.

**References:**

Brogan *et al.* 2004, AJ, 127, 355. VLA at 330 MHz (25"),  
 1.5 GHz (25"), and 74 MHz.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42" :  $S = 3.5 \pm 0.2$  Jy), plus other observations.

**G11.2–0.3**

**RA:** 18<sup>h</sup>11<sup>m</sup>27<sup>s</sup>  
**Dec:** –19°25′

**1-GHz flux/Jy:** 22  
**Spectral index:** 0.5

**Size/arcmin:** 4  
**Type:** C

Probably associated with the SN of AD386.

**Radio:** Symmetrical clumpy shell, with flatter spectrum core.

**X-ray:** Shell, with hard spectrum centrally brightened region around pulsar.

**Point sources:** Central pulsar.

**Distance:** H<sub>I</sub> absorption indicates 4.4 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Radhakrishnan *et al.* 1972, ApJS, 24, 49. H<sub>I</sub> absorption.  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20″×25″) and Einstein observations, with review of flux densities.  
 Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz, plus H<sub>I</sub> absorption, Einstein observations.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (26″5:  $S=4.04\pm 0.24$  Jy).  
 Green *et al.* 1988, MNRAS, 231, 735. VLA at 1.4 and 5 GHz.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3.2×4.1:  $S=39$  Jy).  
 Reynolds *et al.* 1994, MNRAS, 271, L1. ROSAT image and spectra.  
 Vasisht *et al.* 1996, ApJ, 456, L59. ASCA observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Torii *et al.* 1997, ApJ, 489, L145. ASCA detection of pulsar.  
 Torii *et al.* 1999, ApJ, 523, L69. X-ray timing observations of pulsar.  
 Kothes & Reich 2001, A&A, 372, 627. Effelsberg 100-m at 4.25, 10.45, 14.9 and 32 GHz (2.5, 1.1, 0.86 and 0.45:  $S=9.6\pm 0.5, 6.3\pm 0.4, 5.7\pm 0.4$  and  $3.8\pm 0.4$ ).

Kaspi *et al.* 2001, ApJ, 560, 371. Chandra observations.  
 Tam *et al.* 2002, ApJ, 572, 202. VLA at 1.4/1.5 GHz (2.6×1.8:  $S=16.6\pm 0.9$  Jy) and 5 GHz (2.1×1.5:  $S=8.4\pm 0.9$  Jy) for spectral studies.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 14.7 GHz.  
 Tam & Roberts 2003, ApJ, 598, L27. Multi-epoch VLA observations at 1.4/1.5 GHz and 5 GHz, for expansion studies.  
 Roberts *et al.* 2003, ApJ, 588, 992. Chandra observations.  
 Brogan *et al.* 2004, AJ, 127, 355. VLA at 330 MHz (25″), 1.5 GHz (25″), and 74 MHz.  
 Bock & Gaensler 2005, ApJ, 626, 343. BIMA at 88.6 GHz (18″).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Kaplan & Moon 2006, ApJ, 644, 1056. IR upper limit for pulsar.  
 Koo *et al.* 2007, ApJ, 657, 308. IR observations.  
 Dean *et al.* 2008, MNRAS, 384, L29. Integral observations of pulsar and nebula.  
 Moon *et al.* 2009, ApJ, 703, L81. IR spectroscopy.  
 Mizuno *et al.* 2010, AJ, 139, 1542. Spitzer observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5:  $S=9.0\pm 0.5$  Jy) including polarisation and review of flux densities.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Lee *et al.* 2013, ApJ, 770, 143. IR observations.

**G11.4–0.1**

**RA:** 18<sup>h</sup>10<sup>m</sup>47<sup>s</sup>  
**Dec:** –19°05′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.5

**Size/arcmin:** 8  
**Type:** S?

**Radio:** Incomplete shell, possibly with central core.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:  $S=9.4$  Jy) contaminated by sidelobes of a nearby source, and Parkes 64-m at 5 GHz (4′:  $S=2.8$  Jy).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6.8:  $S=2.0\pm 0.4$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3.2×4.1:  $S=$

18 Jy).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (44″×63″:  $S=5.1\pm 0.6$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Brogan *et al.* 2004, AJ, 127, 355. VLA at 330 MHz (25″), 1.5 GHz (25″), and 74 MHz.

**G11.8–0.2**

**RA:** 18<sup>h</sup>12<sup>m</sup>25<sup>s</sup>  
**Dec:** –18°44′

**1-GHz flux/Jy:** 0.7  
**Spectral index:** 0.3

**Size/arcmin:** 4  
**Type:** S

Has been called G11.89–0.21.

**Radio:** Shell.

**X-ray:** Detected.

**References:**

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 0.9 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G12.0–0.1**

**RA:** 18<sup>h</sup>12<sup>m</sup>11<sup>s</sup>  
**Dec:** –18°37′

**1-GHz flux/Jy:** 3.5  
**Spectral index:** 0.7

**Size/arcmin:** 7?  
**Type:** ?

**Radio:** Incomplete shell, defined in E only.

**X-ray:** Detected.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 6.6$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 1.1$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′2 × 4′1).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz

(41″ × 61″ :  $S = 0.7$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.

**G12.2+0.3**

**RA:** 18<sup>h</sup>11<sup>m</sup>17<sup>s</sup>  
**Dec:** –18°10′

**1-GHz flux/Jy:** 0.8  
**Spectral index:** 0.7

**Size/arcmin:** 6 × 5  
**Type:** S

Has been called G12.26+0.30.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 1.5 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G12.5+0.2**

**RA:** 18<sup>h</sup>12<sup>m</sup>14<sup>s</sup>  
**Dec:** –17°55′

**1-GHz flux/Jy:** 0.6  
**Spectral index:** 0.4

**Size/arcmin:** 6 × 5  
**Type:** C?

Has been called G12.58+0.22.

**Radio:** Diffuse, central brightened.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 0.8 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G12.7–0.0**

**RA:** 18<sup>h</sup>13<sup>m</sup>19<sup>s</sup>  
**Dec:** –17°54′

**1-GHz flux/Jy:** 0.8  
**Spectral index:** 0.8

**Size/arcmin:** 6  
**Type:** S

Has been called G12.72–0.00.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 2.0 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G12.8–0.0**

**RA:** 18<sup>h</sup>13<sup>m</sup>37<sup>s</sup>  
**Dec:** –17°49′

**1-GHz flux/Jy:** 0.8  
**Spectral index:** 0.5

**Size/arcmin:** 3  
**Type:** C?

Has been called G12.82–0.02 and G12.83–0.02.

**Radio:** Shell.

**X-ray:** Diffuse.

**Point sources:** Central X-ray pulsar.

**References:**

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Brogan *et al.* 2005, ApJ, 629, L105. VLA at 330 MHz (19″ × 32″), plus other observations.  
 Ubertini *et al.* 2005, ApJ, 629, L109. X-ray,  $\gamma$ -ray and other observations.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 1.2 \pm 0.1$  Jy), plus other observations.  
 Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray detection.

Albert *et al.* 2006, ApJ, 637, L41.  $\gamma$ -ray observations.  
 Landi *et al.* 2006, ApJ, 651, 190. X-ray observations.  
 Funk *et al.* 2007, A&A, 470, 249. XMM observations, CO observations of surroundings.  
 Helfand *et al.* 2007, ApJ, 665, 1297. Chandra observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Gotthelf & Halpern 2009, ApJ, 700, L158. Pulsar detection.  
 Halpern *et al.* 2012, ApJ, 753, L14. Pulsar observations.

**G13.3–1.3**

**RA:** 18<sup>h</sup>19<sup>m</sup>20<sup>s</sup>  
**Dec:** –18°00′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 70 × 40  
**Type:** S?

**Radio:** Amorphous emission.

**Optical:** Filaments in S.

**X-ray:** Elongated emission.

**Distance:** Absorption indicates 2–4 kpc.

**References:**

Seward *et al.* 1995, ApJ, 449, 681. ROSAT detection, optical studies and observations of CO.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.

**G13.5+0.2**

**RA:** 18<sup>h</sup>14<sup>m</sup>14<sup>s</sup>  
**Dec:** –17°12′

**1-GHz flux/Jy:** 3.5?  
**Spectral index:** 1.0?

**Size/arcmin:** 5 × 4  
**Type:** S

Has been called G13.46+0.16.

**Radio:** Elongated, incomplete shell.

**References:**

Helfand *et al.* 1989, ApJ, 341, 151. VLA at 5 GHz ( $S = 0.65 \pm 0.05$  Jy) and 1.4 GHz (15″ :  $S = 2.67 \pm 0.5$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G14.1–0.1**

**RA:** 18<sup>h</sup>16<sup>m</sup>40<sup>s</sup>  
**Dec:** –16°41′

**1-GHz flux/Jy:** 0.5  
**Spectral index:** 0.6

**Size/arcmin:** 6×5  
**Type:** S

Has been called G14.18–0.12.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 0.9 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G14.3+0.1**

**RA:** 18<sup>h</sup>15<sup>m</sup>58<sup>s</sup>  
**Dec:** –16°27′

**1-GHz flux/Jy:** 0.6  
**Spectral index:** 0.4

**Size/arcmin:** 5×4  
**Type:** S

Has been called G14.30+0.14. Has been suggested this is not an SNR.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 1.2 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Pinheiro Gonçalves *et al.* 2011, AJ, 142, 47. IR observations.

**G15.1–1.6**

**RA:** 18<sup>h</sup>24<sup>m</sup>00<sup>s</sup>  
**Dec:** –16°34′

**1-GHz flux/Jy:** 5.5?  
**Spectral index:** 0.0?

**Size/arcmin:** 30×24  
**Type:** S?

**Radio:** Elongated, incomplete shell.

**Optical:** Diffuse shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4.3).  
 Boumis *et al.* 2008, A&A, 481, 705. Optical detection.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5 :  $S = 4.8 \pm 0.3$  Jy) including polarisation and review of flux densities.

**G15.4+0.1**

**RA:** 18<sup>h</sup>18<sup>m</sup>02<sup>s</sup>  
**Dec:** –15°27′

**1-GHz flux/Jy:** 5.6  
**Spectral index:** 0.62

**Size/arcmin:** 15×14  
**Type:** S

Has been called G15.42+0.18.

**Radio:** Shell.

**Distance:** HI observations suggest 4.8 kpc.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 10.9 \pm 0.3$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz

(9.5 :  $S = 2.1 \pm 0.2$  Jy) including polarisation and review of flux densities.  
 Castelletti *et al.* 2013, A&A, 557, L15. GMRT at 1.4 GHz (15″) plus SGPS HI and CO observations of region.

**G15.9+0.2**

**RA:** 18<sup>h</sup>18<sup>m</sup>52<sup>s</sup>  
**Dec:** –15°02′

**1-GHz flux/Jy:** 5.0  
**Spectral index:** 0.63

**Size/arcmin:** 7×5  
**Type:** S?

**Radio:** Incomplete shell, with bright concentration to the E.

**X-ray:** Shell, brighter to S and E.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 7.7$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 1.9$  Jy).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6.8 :  $S = 1.1 \pm 0.2$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz (58″ × 44″).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz

(77″ × 61″ :  $S = 11.2 \pm 1.0$  Jy), 1.4 GHz (23″ × 14″ :  $S = 3.9 \pm 0.1$  Jy) and 4.9 GHz (13″ × 16″).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Reynolds *et al.* 2006, ApJ, 652, L45. Chandra observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5 :  $S = 2.0 \pm 0.3$  Jy) including polarisation and review of flux densities.

**G16.0–0.5**

**RA:** 18<sup>h</sup>21<sup>m</sup>56<sup>s</sup>  
**Dec:** –15°14′

**1-GHz flux/Jy:** 2.7  
**Spectral index:** 0.6

**Size/arcmin:** 15×10  
**Type:** S

Has been called G16.05–0.57.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 4.9 \pm 0.2$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Beaumont *et al.* 2011, ApJ, 741, 14. CO of region.

**G16.2–2.7**

**RA:** 18<sup>h</sup>29<sup>m</sup>40<sup>s</sup>  
**Dec:** –16°08′

**1-GHz flux/Jy:** 2.5  
**Spectral index:** 0.4

**Size/arcmin:** 17  
**Type:** S

**Radio:** Double rim.

**References:**

Trushkin 1999, A&A, 352, L103. Review of radio observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5 :  $S = 1.28 \pm 0.10$  Jy) including polarisation and review of flux densities.

**G16.4–0.5**

**RA:** 18<sup>h</sup>22<sup>m</sup>38<sup>s</sup>  
**Dec:** –14°55′

**1-GHz flux/Jy:** 4.6  
**Spectral index:** 0.3?

**Size/arcmin:** 13  
**Type:** S

Has been called G16.41–0.55.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 10.0 \pm 0.3$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5 :  $S = 3.0 \pm 0.3$  Jy) including polarisation and review of flux densities.



**G16.7+0.1**

**RA:** 18<sup>h</sup>20<sup>m</sup>56<sup>s</sup>  
**Dec:** –14°20′

**1-GHz flux/Jy:** 3.0  
**Spectral index:** 0.6

**Size/arcmin:** 4  
**Type:** C

Has been called G16.73+0.08.

**Radio:** Asymmetric shell with flat-spectrum core.

**X-ray:** Non-thermal core.

**References:**

Helfand *et al.* 1989, ApJ, 341, 151. VLA at 5 GHz (5 :  $S = 0.95$  Jy) and 1.4 GHz (15′ :  $S = 2.43$  Jy) and Ooty at 327 MHz ( $S = 5.13$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including masers.  
 Reynoso & Mangum 2000, ApJ, 545, 874. CO observations of surroundings.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.

Helfand *et al.* 2003, ApJ, 592, 941. XMM observations.  
 Bock & Gaensler 2005, ApJ, 626, 343. BIMA at 88.6 GHz (19′ × 25′).  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Bhatnagar *et al.* 2011, ApJ, 739, L20. VLA at 6 GHz.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 :  $S = 1.23 \pm 0.11$  Jy) including polarisation and review of flux densities.

**G17.0–0.0**

**RA:** 18<sup>h</sup>21<sup>m</sup>57<sup>s</sup>  
**Dec:** –14°08′

**1-GHz flux/Jy:** 0.5  
**Spectral index:** 0.5

**Size/arcmin:** 5  
**Type:** S

Has been called G17.02–0.04.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42′ :  $S = 0.7 \pm 0.1$  Jy), plus other observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.

**G17.4–2.3**

**RA:** 18<sup>h</sup>30<sup>m</sup>55<sup>s</sup>  
**Dec:** –14°52′

**1-GHz flux/Jy:** 5  
**Spectral index:** 0.5?

**Size/arcmin:** 24?  
**Type:** S

**Radio:** Incomplete, poorly defined shell.

**Optical:** Filaments to SE, and diffuse emission.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

Boumis *et al.* 2002, A&A, 385, 1042. Optical observations.  
 Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 :  $S = 2.3 \pm 0.2$  Jy) including polarisation and review of flux densities.

**G17.4–0.1**

**RA:** 18<sup>h</sup>23<sup>m</sup>08<sup>s</sup>  
**Dec:** –13°46′

**1-GHz flux/Jy:** 0.4  
**Spectral index:** 0.7

**Size/arcmin:** 6  
**Type:** S

Has been called G17.48–0.12.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42′ :  $S = 0.9 \pm 0.1$  Jy), plus other observations.

**G17.8–2.6**

**RA:** 18<sup>h</sup>32<sup>m</sup>50<sup>s</sup>  
**Dec:** –14°39′

**1-GHz flux/Jy:** 5  
**Spectral index:** 0.5

**Size/arcmin:** 24  
**Type:** S

**Radio:** Well defined shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'3).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 : S = 2.23±0.13 Jy) including polarisation and review of flux densities.

**G18.1–0.1**

**RA:** 18<sup>h</sup>24<sup>m</sup>34<sup>s</sup>  
**Dec:** –13°11′

**1-GHz flux/Jy:** 4.6  
**Spectral index:** 0.5

**Size/arcmin:** 8  
**Type:** S

Has been called G18.1–0.2 and G18.16–0.16.

**Radio:** Shell.

**X-ray:** Detected.

**Distance:** Association with other sources suggests 4 kpc.

**References:**

Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (8').  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42'' : S = 7.6±0.1 Jy), plus other observations.

Hewitt & Yusef-Zadeh 2009, ApJ, 694, L16. OH maser search.  
 Paron *et al.* 2013, MNRAS, 433, 1619. CO, optical and other observations of region.

**G18.6–0.2**

**RA:** 18<sup>h</sup>25<sup>m</sup>55<sup>s</sup>  
**Dec:** –12°50′

**1-GHz flux/Jy:** 1.4  
**Spectral index:** 0.4

**Size/arcmin:** 6  
**Type:** S

Has been called G18.62–0.28.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42'' : S = 1.9±0.1 Jy), plus other observations.

**G18.8+0.3**

**RA:** 18<sup>h</sup>23<sup>m</sup>58<sup>s</sup>  
**Dec:** –12°23′

**1-GHz flux/Jy:** 33  
**Spectral index:** 0.46

**Size/arcmin:** 17×11  
**Type:** S  
 Kes 67

Has been called G18.9+0.3.

**Radio:** Incomplete shell, in complex region near the HII region W39.

**Distance:** Association with molecular cloud and HII absorption suggests 12 kpc.

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5' : S = 17±7 Jy).  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3' : S = 38 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HII absorption.  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'4) and 5 GHz (4'4).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'6).  
 Milne *et al.* 1989, PASA, 8, 187. Parkes 64-m at 8.4 GHz (3'0 : S = 12.9±1.0 Jy), including polarisation.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (2'9×3'5 : S = 55 Jy).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (75''×55'' : S = 29.9±0.3 Jy).

Dubner *et al.* 1999, AJ, 118, 930. Parkes 64-m at 1.6 GHz (15'') for HII, VLA at 1.6 GHz (17''×12'') for OH, plus CO observations.  
 Dubner *et al.* 2004, A&A, 426, 201. CO observations of environment.  
 Tian *et al.* 2007, A&A, 474, 541. VGPS at 1.4 GHz (1') including HII, plus CO observations of region.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 : S = 15.3±0.9 Jy) including polarisation and review of flux densities.  
 Vasquez *et al.* 2012, A&A, 545, A89. CO observations of region.  
 Paron *et al.* 2012, A&A, 547, A60. CO and other molecular observations of region.

**G18.9–1.1**

**RA:** 18<sup>h</sup>29<sup>m</sup>50<sup>s</sup>  
**Dec:** –12°58′

**1-GHz flux/Jy:** 37  
**Spectral index:** 0.39

**Size/arcmin:** 33  
**Type:** C?

Has been called G18.95–1.1 and G18.94–1.04.

**Radio:** Non-thermal, diffuse partially limb-brightened, with central ridge.

**Optical:** Detected.

**X-ray:** Partial shell.

**Point sources:** Compact X-ray source, with diffuse nebula.

**Distance:** Various observations suggest 2 kpc.

**References:**

Fürst *et al.* 1985, *Nature*, 314, 720. Effelsberg 100-m at 4.75 GHz (2′4″ :  $S=23.8$  Jy), plus other flux densities.  
 Odegard 1986, *AJ*, 92, 1372. TPT at 57.5 MHz (7′2″×8″ :  $S=82\pm 15$  Jy), plus review of flux densities.  
 Barnes & Turtle 1988, *IAUCo*, 101, 347. Molonglo at 408 MHz (2′9″×3′1″ :  $S=58\pm 9$  Jy) and Parkes 64-m at 5 GHz (4′4″×4′1″ :  $S=23\pm 6$  Jy).  
 Patnaik *et al.* 1988, *Nature*, 332, 136. Ooty at 327 MHz (0′6″×1′6″).  
 Fürst *et al.* 1989, *A&A*, 209, 361. Effelsberg 100-m at 4.75 GHz (2′45″ :  $S=23.8$  Jy) and VLA at 1.5 and 4.9 GHz (19″×14″), and Effelsberg 100-m at 1.4 GHz (9″) for H I.  
 Aschenbach *et al.* 1991, *A&A*, 246, L32. ROSAT observations.

Fürst *et al.* 1997, *A&A*, 319, 655. ROSAT observations, and Effelsberg 100-m at 10.6 GHz (1′1″).  
 Reich 2002, in *NSPS*, p1. Effelsberg 100-m at 10.6 GHz, including polarisation.  
 Harrus *et al.* 2004, *ApJ*, 603, 152. ROSAT and ASCA observations.  
 Tüllmann *et al.* 2010, *ApJ*, 720, 848. Chandra detection of compact source.  
 Sun *et al.* 2011, *A&A*, 536, A83. Urumqi 25-m at 5 GHz (9′5″ :  $S=19.6\pm 1.0$  Jy) including polarisation and review of flux densities.  
 Stupar & Parker 2011, *MNRAS*, 414, 2282. H $\alpha$  observations.

**G19.1+0.2**

**RA:** 18<sup>h</sup>24<sup>m</sup>56<sup>s</sup>  
**Dec:** –12°07′

**1-GHz flux/Jy:** 10  
**Spectral index:** 0.5

**Size/arcmin:** 27  
**Type:** S

Has been called G19.15+0.27.

**Radio:** Partial shell.

**References:**

Brogan *et al.* 2006, *ApJ*, 639, L25. VLA at 330 MHz (42″ :  $S=17.4\pm 0.4$  Jy), plus other observations.

**G20.0–0.2**

**RA:** 18<sup>h</sup>28<sup>m</sup>07<sup>s</sup>  
**Dec:** –11°35′

**1-GHz flux/Jy:** 10  
**Spectral index:** 0.1

**Size/arcmin:** 10  
**Type:** F

**Radio:** Faint, filled-centre, polarised.

**X-ray:** Centrally brightened.

**Point sources:** OH source 20.1–0.1 is nearby.

**References:**

Becker & Helfand 1985, *ApJ*, 297, L25. VLA at 1.4 and 5 GHz (12″).  
 Odegard 1986, *AJ*, 92, 1372. TPT at 57.5 MHz (7′2″×8″ :  $S=8.5\pm 2$  Jy), plus review of flux densities.  
 Junkes *et al.* 1988, *LNP*, 316, 134. Effelsberg 100-m at 2.7 GHz (4′3″), including polarisation.

Biggs & Lyne 1996, *MNRAS*, 282, 691. Pulsar search.  
 Sun *et al.* 2011, *A&A*, 536, A83. Urumqi 25-m at 5 GHz (9′5″ :  $S=9.2\pm 0.5$  Jy) including polarisation and review of flux densities.  
 Petriella *et al.* 2013, *A&A*, 554, A73. Chandra observations, plus CO and H I observations of region.

**G20.4+0.1**

**RA:** 18<sup>h</sup>27<sup>m</sup>51<sup>s</sup>  
**Dec:** –11°00′

**1-GHz flux/Jy:** 9?  
**Spectral index:** 0.1?

**Size/arcmin:** 8  
**Type:** S?

Has been called G20.47+0.16.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 4.2 \pm 0.1$  Jy), plus other observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5″ :  $S = 7.5 \pm 0.5$  Jy) including polarisation and review of flux densities.

**G21.0–0.4**

**RA:** 18<sup>h</sup>31<sup>m</sup>12<sup>s</sup>  
**Dec:** –10°47′

**1-GHz flux/Jy:** 1.1  
**Spectral index:** 0.6

**Size/arcmin:** 9×7  
**Type:** S

Has been called G21.04–0.47.

**Radio:** Shell.

**References:**

Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42″ :  $S = 2.3 \pm 0.2$  Jy), plus other observations.

**G21.5–0.9**

**RA:** 18<sup>h</sup>33<sup>m</sup>33<sup>s</sup>  
**Dec:** –10°35′

**1-GHz flux/Jy:** 7  
**Spectral index:** varies

**Size/arcmin:** 5  
**Type:** C

Early observations relate to the central core only.

**Radio:** Filled-centre, with high frequency turnover.

**X-ray:** Central core, with extended, faint halo.

**Point sources:** Central pulsar.

**Distance:** H<sub>I</sub> absorption indicates 4.6 kpc.

**References:**

Wilson & Weiler 1976, A&A, 53, 89. WSRT at 5 GHz (6''×35'').  
 Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20''×5'') and 8 GHz (7''×2''), plus review of flux densities.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'6).  
 Becker & Szymkowiak 1981, ApJ, 248, L23. VLA at 5 GHz (8''), and Einstein observations.  
 Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT X-ray spectrum, and VLA H<sub>I</sub> observations.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (26'': S=5.64±0.29 Jy).  
 Fürst *et al.* 1988, PASJ, 40, 347. NRO array at 22.3 GHz (4'4×7'3).  
 Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4'3), including polarisation.  
 Salter *et al.* 1989, A&A, 225, 167. Observations at 90.7 (29'5 : S=3.8±0.4 Jy) and 141.9 GHz (S=2.5±1.2 Jy).  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz (S=3.94±0.70 Jy), plus review of flux densities.  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'3×3'4 : S=9 Jy).  
 Wallace *et al.* 1994, A&A, 286, 565. H<sub>I</sub> of surroundings.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Slane *et al.* 2000, ApJ, 533, L29. Chandra observations identifying X-ray halo.

Warwick *et al.* 2001, A&A, 365, L248. XMM observations of X-ray halo.  
 Bock *et al.* 2001, ApJ, 561, L203. BIMA at 94 GHz (8'6×4'6).  
 Safi-Harb *et al.* 2001, ApJ, 561, 308. Chandra and other X-ray observations.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 22 GHz (8'') and 32 GHz, including polarisation.  
 La Palombara & Mereghetti 2002, A&A, 383, 916. XMM upper limit on pulsations.  
 Bocchino *et al.* 2005, A&A, 442, 539. XMM and Chandra observations.  
 Gupta *et al.* 2005, Current Science, 89, 853. Pulsar discovery.  
 Camilo *et al.* 2006, ApJ, 637, 456. Pulsar discovery.  
 Bietenholz & Bartel 2008, MNRAS, 386, 1411. VLA at 4.75 GHz (0'53×0'82) for expansion studies.  
 Tian & Leahy 2008, MNRAS, 391, L54. VGPS at 1.4 GHz (1') including H<sub>I</sub>.  
 Matheson & Safi-Harb 2010, ApJ, 724, 572. Chandra observations.  
 Bietenholz *et al.* 2011, MNRAS, 412, 1221. VLA at 1.4 GHz (14''×18'').  
 Bhatnagar *et al.* 2011, ApJ, 739, L20. VLA at 6 GHz.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 : S=6.5±0.4 Jy) including polarisation and review of flux densities.  
 Zajczyk *et al.* 2012, A&A, 542, A12. IR observations, including polarisation.

**G21.5–0.1**

**RA:** 18<sup>h</sup>30<sup>m</sup>50<sup>s</sup>  
**Dec:** –10°09′

**1-GHz flux/Jy:** 0.4  
**Spectral index:** 0.5

**Size/arcmin:** 5  
**Type:** S

Has been called G21.56–0.10.

**Radio:** Partial shell.

**X-ray:** Detected.

**References:**

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Brogan *et al.* 2006, ApJ, 639, L25. VLA at 330 MHz (42'' : S=0.5±0.1 Jy), plus other observations.

**G21.6–0.8**

**RA:** 18<sup>h</sup>33<sup>m</sup>40<sup>s</sup>  
**Dec:** –10°25′

**1-GHz flux/Jy:** 1.4  
**Spectral index:** 0.5<sup>?</sup>

**Size/arcmin:** 13  
**Type:** S

Has been called G21.64–0.84.

**Radio:** Faint, irregular shell.

**References:**

Bietenholz *et al.* 2011, MNRAS, 412, 1221. VLA at 327 MHz (85′ :  $S=2.8$  Jy) and 1.4 GHz (14′′ × 18′′).

**G21.8–0.6**

**RA:** 18<sup>h</sup>32<sup>m</sup>45<sup>s</sup>  
**Dec:** –10°08′

**1-GHz flux/Jy:** 65  
**Spectral index:** 0.56

**Size/arcmin:** 20  
**Type:** S  
**Kes 69**

**Radio:** Incomplete shell.

**X-ray:** Detected.

**Distance:** Association with CO indicates 5.2 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Wilson 1972, A&A, 19, 354. H<sub>2</sub>CO absorption.  
 Kundu *et al.* 1974, AJ, 79, 132. NRAO 140-ft at 5 GHz (6′) and 10 GHz (3′).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′ :  $S=42.3\pm 4.6$  Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4) and 5 GHz (4′4).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Seward 1990, ApJS, 73, 781. Einstein observations.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′3 × 3′5 :  $S=132$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including masers.

Yusef-Zadeh *et al.* 2003, ApJ, 585, 319. X-ray observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Wood *et al.* 2008, AJ, 135, 2358. VLA at 4.8 GHz, including polarisation.  
 Tian & Leahy 2008, MNRAS, 391, L54. VGPS at 1.4 GHz (1′) including HI.  
 Zhou *et al.* 2009, ApJ, 691, 516. CO and HCO<sup>+</sup> of region.  
 Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S=24.0\pm 1.3$  Jy) including polarisation and review of flux densities.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G22.7–0.2**

**RA:** 18<sup>h</sup>33<sup>m</sup>15<sup>s</sup>  
**Dec:** –09°13′

**1-GHz flux/Jy:** 33  
**Spectral index:** 0.6

**Size/arcmin:** 26  
**Type:** S?

**Radio:** Non-thermal ring in complex region, overlapping G23.3–0.3.

**Point sources:** Variable radio source near centre.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′3 × 3′4 :  $S=82$  Jy).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Becker *et al.* 2010, AJ, 140, 157. Variable radio source detection.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G23.3–0.3**

W41

**RA:** 18<sup>h</sup>34<sup>m</sup>45<sup>s</sup>  
**Dec:** –08°48′**1-GHz flux/Jy:** 70  
**Spectral index:** 0.5**Size/arcmin:** 27  
**Type:** S**Radio:** Distorted ring, in complex region, overlapping G22.7–0.2.**X-ray:** Possible extended emission, with compact sources.**Point sources:** Pulsar association suggested.**Distance:** H<sub>I</sub> and CO observations indicate 4.2 kpc.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3.3×3.4 : S = 138 Jy).  
 Gaensler & Johnston 1995, MNRAS, 275, L73. Possible pulsar association.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Aharonian *et al.* 2005, Science, 307, 1938.  $\gamma$ -ray detection.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray observations.  
 Albert *et al.* 2006, ApJ, 643, L53.  $\gamma$ -ray observations.  
 Landi *et al.* 2006, ApJ, 651, 190. X-ray observations.  
 Tian *et al.* 2007, ApJ, 657, L25. VGPS at 1.4 GHz (1′) including H<sub>I</sub>, plus XMM observations.  
 Leahy & Tian 2008, AJ, 135, 167. VGPS at 1.4 GHz (1′) including H<sub>I</sub>, plus CO observations.  
 Mukherjee *et al.* 2009, ApJ, 691, 1707. XMM and  $\gamma$ -ray observations.  
 Frail *et al.* 2013, ApJ, 773, L19. OH observations.  
 Castro *et al.* 2013, ApJ, 774, 36. Fermi observations.

**G23.6+0.3****RA:** 18<sup>h</sup>33<sup>m</sup>03<sup>s</sup>  
**Dec:** –08°13′**1-GHz flux/Jy:** 8?  
**Spectral index:** 0.3**Size/arcmin:** 10?  
**Type:** ?

Has been suggested this is not an SNR.

**Radio:** Not well resolved, in complex region.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Pinheiro Gonçalves *et al.* 2011, AJ, 142, 47. IR observations.

**G24.7–0.6****RA:** 18<sup>h</sup>38<sup>m</sup>43<sup>s</sup>  
**Dec:** –07°32′**1-GHz flux/Jy:** 8  
**Spectral index:** 0.5**Size/arcmin:** 15?  
**Type:** S?**Radio:** Incomplete shell, defined in SW.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 12.3 Jy) and Parkes 64-m at 5 GHz (4′ : S = 3.6 Jy).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6.8 : S = 2.2±0.5 Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at

4.9 GHz (2.6).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (44″×56″ : S = 1.9 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G24.7+0.6****RA:** 18<sup>h</sup>34<sup>m</sup>10<sup>s</sup>  
**Dec:** –07°05′**1-GHz flux/Jy:** 20?  
**Spectral index:** 0.2?**Size/arcmin:** 30×15  
**Type:** C?**Radio:** Filled-centre, with faint shell, and a compact H<sub>II</sub> region to the S.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2.6).  
 Reich *et al.* 1984, A&A, 133, L4. Effelsberg 100-m at 2.7 GHz

(4.3 : S = 19±3 Jy) and 4.75 GHz (2.4 : S = 17±4 Jy) and NRO 45-m at 10.2 GHz (2.7 : S = 15±3 Jy).  
 Becker & Helfand 1987, ApJ, 316, 660. VLA at 1.4 GHz (12″), and X-ray upper limit.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G25.1–2.3**

**RA:** 18<sup>h</sup>45<sup>m</sup>10<sup>s</sup>  
**Dec:** –08°00′

**1-GHz flux/Jy:** 8  
**Spectral index:** 0.57

**Size/arcmin:** 80×30?  
**Type:** S

**Radio:** Incomplete shell, extent not well defined.

**References:**

Gao *et al.* 2011, A&A, 532, A144. Urumqi 25-m at 5 GHz (9′5″:S=3.7±0.4 Jy), plus other observations.

**G27.4+0.0**

**RA:** 18<sup>h</sup>41<sup>m</sup>19<sup>s</sup>  
**Dec:** –04°56′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.68

**4C–04.71**  
**Size/arcmin:** 4  
**Type:** S

Early references refer to G27.3–0.1 (Kes 73), a supposed larger remnant.

**Radio:** Incomplete shell.

**X-ray:** Diffuse emission, with central low period pulsar.

**Point sources:** Central AXP.

**Distance:** HI absorption suggests 7.5 to 9.8 kpc.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′).  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′:S=4.4 Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4″) and 5 GHz (4′4″).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′8″:S=2.0±0.5 Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6″).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz (60″×45″:S=3.5 Jy). Revise S<sub>408 MHz</sub>=10.4 Jy, and S<sub>5 GHz</sub>=1.9±0.2 Jy.  
 Kriss *et al.* 1985, ApJ, 288, 703. Einstein observations, plus VLA at 1.4 and 5 GHz (12′).  
 Sanbonmatsu & Helfand 1992, AJ, 104, 2189. VLA at 1.4 GHz for HI absorption.  
 Helfand *et al.* 1994, ApJ, 434, 627. ROSAT observations, particularly of central source.

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including nearby masers.  
 Vasisht & Gotthelf 1997, ApJ, 486, L129. ASCA detection of pulsar.  
 Gotthelf & Vasisht 1997, ApJ, 486, L133. ASCA observations.  
 Gotthelf *et al.* 1999, ApJ, 522, L49. X-ray timing observations of pulsar.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Mereghetti *et al.* 2001, MNRAS, 321, 143. Search for optical/IR counterpart to pulsar.  
 Kuiper *et al.* 2004, ApJ, 613, 1173. X-ray observations of pulsar.  
 Tian & Leahy 2008, ApJ, 677, 292. VGPS at 1.4 GHz (1′) including HI.  
 Mizuno *et al.* 2010, AJ, 139, 1542. Spitzer observations.  
 An *et al.* 2013, ApJ, 779, 163. NuSTAR and  $\gamma$ -ray observations.

**G27.8+0.6**

**RA:** 18<sup>h</sup>39<sup>m</sup>50<sup>s</sup>  
**Dec:** –04°24′

**1-GHz flux/Jy:** 30  
**Spectral index:** varies

**Size/arcmin:** 50×30  
**Type:** F

**Radio:** Filled-centre, with spectral turnover.

**X-ray:** Possible pulsar wind nebula.

**References:**

Reich *et al.* 1984, A&A, 133, L4. Effelsberg 100-m at 2.7 GHz (4′3″:S=23±2 Jy), and 4.75 GHz (2′4″:S=18±2 Jy) and NRO 45-m at 10.2 GHz (smoothed to 4′3″:S=8.5±2 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observa-

tions.  
 Misanovic *et al.* 2010, ApJ, 725, 931. XMM pulsar/wind nebula search.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5″:S=21.0±1.1 Jy) including polarisation and review of flux densities.



**G28.6–0.1**

**RA:** 18<sup>h</sup>43<sup>m</sup>55<sup>s</sup>  
**Dec:** –03°53′

**1-GHz flux/Jy:** 3?  
**Spectral index:** ?

**Size/arcmin:** 13×9  
**Type:** S

**Radio:** Poorly defined regions of non-thermal emission.

**X-ray:** Diffuse shell, with thermal and non-thermal emission.

**References:**

Helfand *et al.* 1989, ApJ, 341, 151. VLA at 1.4 GHz (15'') and 5 GHz (15'').  
 Bamba *et al.* 2001, PASJ, 53, L21. ASCA observations.  
 Ueno *et al.* 2003, ApJ, 588, 338. Chandra observations.  
 Ebisawa *et al.* 2005, ApJ, 635, 214. Chandra observations.

**G28.8+1.5**

**RA:** 18<sup>h</sup>39<sup>m</sup>00<sup>s</sup>  
**Dec:** –02°55′

**1-GHz flux/Jy:** ?  
**Spectral index:** 0.4?

**Size/arcmin:** 100?  
**Type:** S?

**Radio:** Part of rim detected.

**X-ray:** Diffuse, Centrally brightened.

**References:**

Schwentker 1994, A&A, 286, L47. ROSAT observations.  
 Song *et al.* 2000, PASJ, 52, 181. ASCA observations.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observa-

tions.  
 Misanovic *et al.* 2010, ApJ, 725, 931. XMM pulsar/wind nebula search.

**G29.6+0.1**

**RA:** 18<sup>h</sup>44<sup>m</sup>52<sup>s</sup>  
**Dec:** –02°57′

**1-GHz flux/Jy:** 1.5?  
**Spectral index:** 0.5?

**Size/arcmin:** 5  
**Type:** S

**Radio:** Diffuse shell.

**Point sources:** AXP associated.

**References:**

Gaensler *et al.* 1999, ApJ, 526, L37. VLA at 5 GHz (13'') and 8 GHz (8'').  
 Vasisht *et al.* 2000, ApJ, 542, L49. X-ray observations of AXP.

**G29.7–0.3**

Kes 75

**RA:** 18<sup>h</sup>46<sup>m</sup>25<sup>s</sup>  
**Dec:** –02°59′**1-GHz flux/Jy:** 10  
**Spectral index:** 0.63**Size/arcmin:** 3  
**Type:** C

Has erroneously been called G29.6+0.1.

**Radio:** Shell with flatter spectrum emission from centre.**X-ray:** Thermal shell and non-thermal core, and central pulsar.**Point sources:** X-ray pulsar.**Distance:** Association with CO implies 11 kpc.**References:**

- Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8′4″: S=5±20% Jy).  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20″×7″) and 8 GHz (25″×8″), plus review of flux densities.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6″).  
 Becker *et al.* 1983, ApJ, 268, L93. VLA at 1.4 GHz (3″), plus Einstein observations.  
 Becker & Helfand 1984, ApJ, 283, 154. VLA at 5 GHz (2′6″), plus Hi.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (26′5″: S=1.02±0.07 Jy).  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′4″×3′7″: S=27.4 Jy).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Blanton & Helfand 1996, ApJ, 470, 961. ASCA observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Gotthelf *et al.* 2000, ApJ, 542, L37. X-ray pulsar detection.
- Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Mereghetti *et al.* 2002, ApJ, 574, 873. BeppoSAX observations of pulsar.  
 Helfand *et al.* 2003, ApJ, 582, 783. Chandra observations.  
 Bock & Gaensler 2005, ApJ, 626, 343. BIMA at 88.6 GHz (10″×13″).  
 Morton *et al.* 2007, ApJ, 667, 219. Spitzer and Chandra observations.  
 McBride *et al.* 2008, A&A, 477, 249.  $\gamma$ -ray and Chandra observations.  
 Leahy & Tian 2008, A&A, 480, L25. VGPS at 1.4 GHz (1′) including Hi.  
 Kumar & Safi-Harb 2008, ApJ, 678, L43. Chandra observations.  
 Ng *et al.* 2008, ApJ, 686, 508. Chandra observations.  
 Gavriil *et al.* 2008, Science, 319, 1802. X-ray observations of pulsar.  
 Su *et al.* 2009, ApJ, 694, 376. CO observations of region, plus Chandra observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5″: S=3.6±0.6 Jy) including polarisation and review of flux densities.

**G30.7–2.0****RA:** 18<sup>h</sup>54<sup>m</sup>25<sup>s</sup>  
**Dec:** –02°54′**1-GHz flux/Jy:** 0.5?  
**Spectral index:** 0.7?**Size/arcmin:** 16  
**Type:** ?**Radio:** Poorly defined.**References:**

- Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′3″).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G30.7+1.0****RA:** 18<sup>h</sup>44<sup>m</sup>00<sup>s</sup>  
**Dec:** –01°32′**1-GHz flux/Jy:** 6  
**Spectral index:** 0.4**Size/arcmin:** 24×18  
**Type:** S?**Radio:** Non-thermal, highly polarised part shell?**Point sources:** Compact source near centre.**References:**

- Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2′4″: S=3.4±0.4 Jy), plus other flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′6″×3′9″: S=8.6 Jy).
- Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5″: S=2.93±0.19 Jy) including polarisation and review of flux densities.

**G31.5–0.6**

**RA:** 18<sup>h</sup>51<sup>m</sup>10<sup>s</sup>  
**Dec:** –01°31′

**1-GHz flux/Jy:** 2?  
**Spectral index:** ?

**Size/arcmin:** 18?  
**Type:** S?

Has been called G31.55–0.65.

**Radio:** Distorted shell? near H<sub>II</sub> region.

**Optical:** Diffuse, incomplete shell.

**References:**

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2'4), plus other flux densities.  
 Mavromatakis *et al.* 2001, A&A, 370, 265. Optical observations.

**G31.9+0.0**

3C391

**RA:** 18<sup>h</sup>49<sup>m</sup>25<sup>s</sup>  
**Dec:** –00°55′

**1-GHz flux/Jy:** 25  
**Spectral index:** varies

**Size/arcmin:** 7×5  
**Type:** S

**Radio:** Shell, brightest in NW, with low frequency turnover.

**X-ray:** Diffuse with central core.

**Distance:** H<sub>I</sub> absorption is seen to the tangent point (8.5 kpc).

**References:**

Radhakrishnan *et al.* 1972, ApJS, 24, 49. H<sub>I</sub> absorption.  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3').  
 Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15 GHz (58'' :  $S > 1.6$ ).  
 Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20''×23'') and 8 GHz (24''×9''), plus review of flux densities.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'6).  
 Goss *et al.* 1979, A&A, 78, 75. FIRST at 1.4 GHz (54''×66'' :  $S = 20 \pm 2$  Jy) and Effelsberg 100-m at 10.7 GHz (77'' :  $S = 7.5 \pm 0.8$  Jy).  
 Wang & Seward 1984, ApJ, 279, 705. Einstein observations.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'4×3'7 :  $S = 44.8$  Jy).  
 Reynolds & Moffett 1993, AJ, 105, 2226. VLA at 1.4 GHz (6''), including possible associated CO.  
 Moffett & Reynolds 1994, ApJ, 425, 668. VLA at 330 MHz (smoothed to 30'' :  $S = 38.5 \pm 0.5$  Jy) 1.46 GHz (6'7) and 4.85 GHz (6'2×6'4), including spectral index and polarisation studies.  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Reach & Rho 1996, A&A, 315, L277. ISO spectroscopy.  
 Rho & Petre 1996, ApJ, 467, 698. ROSAT observations.  
 Wilner *et al.* 1998, AJ, 115, 247. CO observations of surroundings.  
 Reach & Rho 1998, ApJ, 507, L93. ISO observations.  
 Reach & Rho 1999, ApJ, 511, 836. CO, HCO<sup>+</sup> and CS observations of surroundings.  
 Reach & Rho 2000, ApJ, 544, 843. ISO observations of interactions with surroundings.  
 see also: Reach & Rho 2001, ApJ, 558, 943. Erratum.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Chen & Slane 2001, ApJ, 563, 202. ASCA observations.  
 Reach *et al.* 2002, ApJ, 564, 302. Observations of shocked molecular species.  
 Chen *et al.* 2004, ApJ, 616, 885. Chandra observations.  
 Brogan *et al.* 2005, AJ, 130, 148. VLA at 74 MHz, 330 MHz and 1.5 GHz (70'').  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Neufeld *et al.* 2007, ApJ, 664, 890. Spitzer observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Castro & Slane 2010, ApJ, 717, 372. Fermi observations.  
 Yuan & Neufeld 2011, ApJ, 726, 76. Spitzer observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 :  $S = 8.9 \pm 0.6$  Jy) including polarisation and review of flux densities.

**G32.0–4.9**

3C396.1

**RA:** 19<sup>h</sup>06<sup>m</sup>00<sup>s</sup>  
**Dec:** –03°00′

**1-GHz flux/Jy:** 22?  
**Spectral index:** 0.5?

**Size/arcmin:** 60?  
**Type:** S?

**Radio:** Possible large shell?

**References:**

Milne & Hill 1969, AuJPh, 22, 211. Parkes 64-m at 635 MHz (31' :  $S = 25 \pm 30\%$  Jy), 1410 MHz (15' :  $S = 19 \pm 15\%$  Jy) and 2650 MHz (8'4 :  $S = 8.6 \pm 30\%$  Jy). Fluxes if size is 60', plus review of flux densities.  
 Caswell 1970, AuJPh, 23, 105. Revision of low frequency flux densities.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 111 MHz ( $S = 105 \pm 30$  Jy).

**G32.1–0.9**

**RA:** 18<sup>h</sup>53<sup>m</sup>10<sup>s</sup>  
**Dec:** –01°08′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 40?  
**Type:** C?

**Radio:** Possible faint shell, not well defined.

**X-ray:** Diffuse, with clumps.

**References:**

Folgheraiter *et al.* 1997, MNRAS, 292, 365. ROSAT and ASCA observations.

**G32.4+0.1**

**RA:** 18<sup>h</sup>50<sup>m</sup>05<sup>s</sup>  
**Dec:** –00°25′

**1-GHz flux/Jy:** 0.25?  
**Spectral index:** ?

**Size/arcmin:** 6  
**Type:** S

Has been called G32.45+0.1.

**Radio:** Shell.

**X-ray:** Shell.

**Distance:** X-ray absorption suggests 17 kpc.

**References:**

Yamaguchi *et al.* 2004, PASJ, 56, 1059. XMM and other observations.  
 Ueno *et al.* 2005, in XRRC, E4.18. XMM observations.

**G32.8–0.1**

**RA:** 18<sup>h</sup>51<sup>m</sup>25<sup>s</sup>  
**Dec:** –00°08′

**1-GHz flux/Jy:** 11?  
**Spectral index:** 0.2?

**Size/arcmin:** 17  
**Type:** S?

Kes 78

Part has been called G33.1–0.1.

**Radio:** Elongated shell?

**Optical:** Detected.

**X-ray:** NE rim detected.

**Distance:** Association with CO indicates 4.8 kpc.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 7.2 \pm 0.5$  Jy).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 430 MHz ( $S = 19.0 \pm 15.5$  Jy).  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz ( $3'$ ).  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $3' : S = 12.8$  Jy) and Parkes 64-m at 5 GHz ( $4' : S = 7.7$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'6$ ).

Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3'6 \times 3'8 : S = 31.3$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA detection of compact OH emission.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.  
 Zhou & Chen 2011, ApJ, 743, 4. XMM observations, plus CO of region.

**G33.2–0.6**

**RA:** 18<sup>h</sup>53<sup>m</sup>50<sup>s</sup>  
**Dec:** –00°02′

**1-GHz flux/Jy:** 3.5  
**Spectral index:** varies

**Size/arcmin:** 18  
**Type:** S

**Radio:** Incomplete shell.

**Optical:** Filaments and diffuse emission.

**References:**

Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'6$ ).  
 Reich 1982, A&A, 106, 314. Effelsberg 100-m at 2.7 GHz ( $4'4 : S = 2.6 \pm 0.3$  Jy) and 4.75 GHz ( $2'5 : S = 1.75 \pm 0.2$  Jy).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz ( $68'' \times 52'' :$

$S = 2.7 \pm 0.3$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Boumis *et al.* 2009, A&A, 499, 789. Optical observations.

**G33.6+0.1**

**RA:** 18<sup>h</sup>52<sup>m</sup>48<sup>s</sup>  
**Dec:** +00°41′

**1-GHz flux/Jy:** 20  
**Spectral index:** 0.51

Kes 79, 4C00.70, HC13

**Size/arcmin:** 10  
**Type:** S

Has been called G33.7+0.0.

**Radio:** Shell, with bright central region, in complex region.

**X-ray:** Multiple shells and filaments.

**Point sources:** Central X-ray pulsar.

**Distance:** H I absorption gives about 7.8 kpc.

**References:**

- Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $3'$ :  $S=35.5$  Jy) and Parkes 64-m at 5 GHz ( $4'$ :  $S=7.8$  Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. H I absorption.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430}$  MHz =  $69 \pm 33$  Jy.  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz ( $3'$ :  $S=6.8 \pm 1.5$  Jy).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $6'8$ :  $S=11.4 \pm 1.1$  Jy).  
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz ( $1'$ ), plus observations of the nearby point source.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT H I absorption to nearby point source, possibly extragalactic.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source, plus Einstein observations.  
 Green 1989, MNRAS, 238, 737. OH absorption.  
 Frail & Clifton 1989, ApJ, 336, 854. VLA at 1.4 GHz ( $1' \times 2'9$ ), including H I absorption.  
 Velusamy *et al.* 1991, AJ, 102, 676. VLA at 327 MHz ( $1'$ ), 1.5 GHz ( $7'' \times 14''$ ) and 5 GHz ( $7''$ ), including spectral comparison.  
 Green & Dewdney 1992, MNRAS, 254, 686. Observations of adjacent molecular material.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3'6 \times 3'8$ :  $S=34.8$  Jy).  
 Seward & Velusamy 1995, ApJ, 439, 715. ROSAT observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Tsunemi & Enoguchi 2002, PASJ, 54, 735. ASCA observations.  
 Seward *et al.* 2003, ApJ, 584, 414. Chandra observations.  
 Stanimirović 2003, ApJ, 592, 953. Arecibo OH absorption.  
 Sun *et al.* 2004, ApJ, 605, 742. Chandra observations.  
 Gotthelf *et al.* 2005, ApJ, 627, 390. XMM pulsar detection.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Halpern *et al.* 2007, ApJ, 665, 1304. X-ray pulsar timing observations.  
 Giacani *et al.* 2009, A&A, 507, 841. VLA at 74 MHz ( $36'' \times 39''$ :  $S=76 \pm 10$  Jy), 324 MHz ( $13''$ :  $S=39 \pm 8$  Jy) and 1.5 GHz ( $17'' \times 19''$ :  $S=11.5 \pm 1.5$  Jy), plus review of flux densities and XMM observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9'5$ :  $S=9.4 \pm 0.5$  Jy) including polarisation and review of flux densities.

**G34.7–0.4**

**RA:** 18<sup>h</sup>56<sup>m</sup>00<sup>s</sup>  
**Dec:** +01°22′

**1-GHz flux/Jy:** 250  
**Spectral index:** 0.37

W44, 3C392

**Size/arcmin:** 35×27  
**Type:** C

Has been called G34.6–0.5.

**Radio:** Distorted shell, brighter to the E, with pulsar and associated nebula.

**Optical:** Diffuse emission.

**X-ray:** Centrally concentrated, thermal spectrum, plus pulsar wind nebula.

**Point sources:** Pulsar within the boundary of the remnant.

**Distance:** HI absorption indicates 2.8 kpc.

**References:**

Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10.7 GHz ( $3' : S = 105 \pm 7$  Jy).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 177 \pm 10$  Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ( $3' : S = 299$  Jy).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430}$  MHz =  $540 \pm 187$  Jy.  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ( $8.4'$ ) and 5 GHz ( $4.4'$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2.6'$ ).  
 Smith *et al.* 1985, MNRAS, 217, 99. Einstein observations.  
 Wolszczan *et al.* 1991, ApJ, 372, L99. Pulsar detection.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3.6 \times 3.8' : S = 469$  Jy).  
 Jones *et al.* 1993, MNRAS, 265, 631. VLA at 1.4 GHz ( $15''$ ), plus X-ray spectra.  
 Rho *et al.* 1994, ApJ, 430, 757. Optical and ROSAT observations.  
 Koo & Heiles 1995, ApJ, 442, 679. HI of surrounding shell.  
 Esposito *et al.* 1996, ApJ, 461, 820. Possible associated  $\gamma$ -ray emission.  
 Harrus *et al.* 1996, ApJ, 464, L161. ASCA observations.  
 Frail *et al.* 1996, ApJ, 464, L165. VLA at 1.5 and 8.4 GHz ( $8.9 \times 7.8'$ ) of pulsar nebula.  
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Reach & Rho 1996, A&A, 315, L277. ISO spectroscopy.  
 Harrus *et al.* 1997, ApJ, 488, 781. X-ray observations.  
 Claussen *et al.* 1997, ApJ, 489, 143. VLA of associated OH masers.  
 Giacani *et al.* 1997, AJ, 113, 1379. VLA at 1.4 GHz ( $15''$ ), plus optical images.  
 Seta *et al.* 1998, ApJ, 505, 286. CO observations of surroundings.  
 Cox *et al.* 1999, ApJ, 524, 179. Revision of distance.  
 Reach & Rho 2000, ApJ, 544, 843. ISO observations of interac-

tions with surroundings.  
 see also: Reach & Rho 2001, ApJ, 558, 943. Erratum.  
 Roberts *et al.* 2001, ApJS, 133, 451. ASCA observations.  
 Petre *et al.* 2002, ApJ, 579, 404. Chandra observations of pulsar and wind nebula.  
 Mavromatakis *et al.* 2003, A&A, 405, 591. Optical observations.  
 Shelton *et al.* 2004, ApJ, 611, 906. Chandra observations of part.  
 Reach *et al.* 2005, ApJ, 618, 297. Molecular line and near-IR observations.  
 Hoffman *et al.* 2005, ApJ, 627, 803. Observations of OH masers.  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Neufeld *et al.* 2007, ApJ, 664, 890. Spitzer observations.  
 Castelletti *et al.* 2007, A&A, 471, 537. VLA at 74 MHz ( $36'' \times 39'' : S = 634 \pm 70$  Jy) and 324 MHz ( $13'' : S = 411 \pm 50$  Jy).  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Abdo *et al.* 2010, Science, 327, 1103. Fermi observations.  
 Yuan & Neufeld 2011, ApJ, 726, 76. Spitzer observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5' : S = 118 \pm 6$  Jy) including polarisation and review of flux densities.  
 Giuliani *et al.* 2011, ApJ, 742, L30.  $\gamma$ -ray observations.  
 Uchiyama *et al.* 2012, ApJ, 749, L35. Fermi observations.  
 Uchida *et al.* 2012, PASJ, 64, 141. Suzaku observations.  
 Ackermann *et al.* 2013, Science, 339, 807. Fermi observations.  
 Yoshiike *et al.* 2013, ApJ, 768, 179. CO and HI observations of region.  
 Sashida *et al.* 2013, ApJ, 774, 10. HCO<sup>+</sup> and CO observations of region.  
 Park *et al.* 2013, ApJ, 777, 14. Arecibo HI observations of region.

**G35.6–0.4**

**RA:** 18<sup>h</sup>57<sup>m</sup>55<sup>s</sup>  
**Dec:** +02°13′

**1-GHz flux/Jy:** 9  
**Spectral index:** 0.5

**Size/arcmin:** 15×11  
**Type:** S?

Re-identified as SNR in 2009.

**Radio:** Diffuse, with some limb brightening.

**References:**

Green 2009, MNRAS, 399, 177. Identification in the radio as a SNR.  
 Paron & Giacani 2010, A&A, 509, L4. CO and IR observations of region.  
 Zhu *et al.* 2013, ApJ, 775, 95. HI and other observations.

**G36.6–0.7**

**RA:** 19<sup>h</sup>00<sup>m</sup>35<sup>s</sup>  
**Dec:** +02°56′

**1-GHz flux/Jy:** 1.0  
**Spectral index:** 0.7?

**Size/arcmin:** 25?  
**Type:** S?

**Radio:** polarised arc, possibly part of a larger shell?

**References:**

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2.4), plus other flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3.4×3.7 : S = 6.7 Jy).  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.

Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9.5 : S = 0.39±0.04 Jy) including polarisation and review of flux densities.

**G36.6+2.6**

**RA:** 18<sup>h</sup>48<sup>m</sup>49<sup>s</sup>  
**Dec:** +04°26′

**1-GHz flux/Jy:** 0.7?  
**Spectral index:** 0.5?

**Size/arcmin:** 17×13?  
**Type:** S

**Radio:** Poorly resolved shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4.3).

**G38.7–1.3**

**RA:** 19<sup>h</sup>06<sup>m</sup>40<sup>s</sup>  
**Dec:** +04°28′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 32×19?  
**Type:** S

G38.7–1.4 refers to the E portion.

**Radio:** Incomplete shell.

**Optical:** Arc of filaments, brighter to E.

**X-ray:** Detected in E.

**References:**

Schaudel *et al.* 2002, ASPC, 271, 391. ROSAT observations of E.  
 Sabin *et al.* 2013, MNRAS, 431, 279. H $\alpha$  and radio survey observations.

**G39.2–0.3**

**RA:** 19<sup>h</sup>04<sup>m</sup>08<sup>s</sup>  
**Dec:** +05°28′

**1-GHz flux/Jy:** 18  
**Spectral index:** 0.34

3C396, HC24, NRAO 593

**Size/arcmin:** 8×6  
**Type:** C

**Radio:** Shell, brighter to W, with faint ‘tail’ to E.

**X-ray:** Diffuse, brighter to W, with central core.

**Point sources:** Central X-ray source.

**Distance:** H<sub>I</sub> absorption suggests > 7.7 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo S<sub>430</sub> MHz = 54±38 Jy.  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′ : S = 4.1±1.0 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. H<sub>I</sub> absorption.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1.4 GHz (65″×48″).  
 Becker & Helfand 1987, AJ, 94, 1629. VLA at 1.4 GHz (12″ : S = 14 Jy) and 5 GHz, plus Einstein observations.  
 Patnaik *et al.* 1990, A&A, 232, 467. VLA at 1.5 GHz (25″) and 1.4 GHz (7″.8×7″.5) and 5 GHz (25″) including polarisation, plus Ooty at 327 MHz (100″×31″), including review of flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.5×3′.6 : S = 42.5 Jy).  
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz for spectral index studies.

Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.  
 Harrus & Slane 1999, ApJ, 516, 811. ASCA observations.  
 Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.  
 Olbert *et al.* 2003, ApJ, 592, L45. Chandra observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Scaife *et al.* 2007, MNRAS, 377, L69. 33 GHz observations.  
 Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Lee *et al.* 2009, ApJ, 691, 1042. IR observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 : S = 8.8±0.5 Jy) including polarisation and review of flux densities.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Su *et al.* 2011, ApJ, 727, 43. Chandra and CO observations of region.

**G39.7–2.0**

**RA:** 19<sup>h</sup>12<sup>m</sup>20<sup>s</sup>  
**Dec:** +04°55′

**1-GHz flux/Jy:** 85?  
**Spectral index:** 0.7?

W50, SS433

**Size/arcmin:** 120×60  
**Type:** ?

Eastern part has been called G40.0–3.1. Is this a SNR?

**Radio:** Elongated shell, containing SS433, adjacent to the H<sub>II</sub> region S74.

**Optical:** Faint filaments at the edge of the radio emission.

**X-ray:** Emission from SS433 and two lobes.

**Point sources:** SS433 is the compact source in the centre of the W50.

**Distance:** H<sub>I</sub> absorption indicates 6.0±0.5 kpc.

**References:**

van den Bergh 1980, ApJ, 236, L23. Optical in H $\alpha$  and [SII].  
 Zealey *et al.* 1980, MNRAS, 192, 731. Optical spectra.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT H<sub>I</sub> absorption to nearby point source (not SS433).  
 Seauquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Watson *et al.* 1983, ApJ, 273, 688. X-ray observations.  
 Downes *et al.* 1986, MNRAS, 218, 393. Effelsberg 100-m at 4.75 GHz (2′.4 : S = 34±4 Jy), plus previous 1.7 and 2.7 GHz data.  
 Romney *et al.* 1987, ApJ, 321, 822. VLBI of SS433, including distance.  
 Elston & Baum 1987, AJ, 94, 1633. Mosaic with VLA at 1.4 GHz (30″) of fine structure only.  
 Kawai *et al.* 1989, PASJ, 41, 491. X-ray observations of SS433.  
 Band 1989, ApJ, 336, 937. Einstein and EXOSAT observations.  
 Yamauchi *et al.* 1994, PASJ, 46, L109. X-ray spectral observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

Brinkmann *et al.* 1996, A&A, 312, 306. ROSAT observations.  
 Kotani *et al.* 1996, PASJ, 48, 619. X-ray line emission from SS433.  
 Safi-Harb & Ögelman 1997, ApJ, 483, 868. ROSAT observations.  
 Dubner *et al.* 1998, AJ, 116, 1842. VLA at 328 MHz (64″×60″ : S = 160±20 Jy), and 1.4 GHz (56″×54″), plus NRAO 140-ft at 1.4 GHz (21′) for H<sub>I</sub> observations.  
 Safi-Harb & Petre 1999, ApJ, 512, 784. X-ray observations.  
 Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.  
 Brinkmann *et al.* 2007, A&A, 463, 611. XMM observations of E lobe.  
 Boumis *et al.* 2007, MNRAS, 381, 308. Optical observations.  
 Lockman *et al.* 2007, MNRAS, 381, 881. H<sub>I</sub> observations.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′.5 : S = 37±4 Jy), including polarisation and review of flux densities.



**G40.5–0.5**

**RA:** 19<sup>h</sup>07<sup>m</sup>10<sup>s</sup>  
**Dec:** +06°31′

**1-GHz flux/Jy:** 11  
**Spectral index:** 0.4

**Size/arcmin:** 22  
**Type:** S

**Radio:** Shell, brightest to the NE.

**References:**

Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Downes *et al.* 1980, A&A, 92, 47. Effelsberg 100-m at 1.7 GHz (7′6:  $S=9.3\pm 1.3$  Jy), and 2.7 GHz (4′4:  $S=7.2\pm 0.5$  Jy), plus review of flux densities.  
 Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.

Yang *et al.* 2006, ChJAA, 6, 210. CO observations of surroundings.  
 Abdo *et al.* 2007, ApJ, 664, L91.  $\gamma$ -ray observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5:  $S=6.4\pm 0.3$  Jy) including polarisation and review of flux densities.

**G41.1–0.3**

**RA:** 19<sup>h</sup>07<sup>m</sup>34<sup>s</sup>  
**Dec:** +07°08′

**1-GHz flux/Jy:** 25  
**Spectral index:** 0.50

**Size/arcmin:** 4.5×2.5  
**Type:** S

3C397

**Radio:** 3C397 is two sources: the E is the SNR, the W is a HII region.

**X-ray:** Brighter to the E and W, with central component.

**Distance:** Possible limit of > 7.5 kpc for non-thermal component from HI absorption.

**References:**

Kundu *et al.* 1974, AJ, 79, 132. NRAO 140-ft at 10 GHz (3′) and 5 GHz (6′).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′:  $S=21.3\pm 1.2$  Jy for both components).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430\text{ MHz}} = 82\pm 51$  Jy, also Algonquin 46-m at 10.6 GHz (3′:  $S=12\pm 2$  Jy), and Haystack 36-m at 15.5 GHz (2′3:  $S=8.5\pm 3.0$  Jy).  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′:  $S=29.8$  Jy) and Parkes 64-m at 5 GHz (4′:  $S=8.7$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1.4 GHz (58″×52″).  
 Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz (8″), plus Einstein observations.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to 30″:  $S=4.10\pm 0.19$  Jy).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′5×3′6:  $S=46.3$  Jy).  
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz, for spectral index studies.

Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Chen *et al.* 1999, ApJ, 520, 737. ASCA and ROSAT observations.  
 Dyer & Reynolds 1999, ApJ, 526, 365. VLA at 1.5 GHz (6′9×6′6) and 4.8 GHz (46′4×5′6), including polarisation and comparison with ROSAT image.  
 Safi-Harb *et al.* 2000, ApJ, 545, 922. ROSAT, ASCA and other X-ray observations.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.  
 Safi-Harb *et al.* 2005, ApJ, 618, 321. Chandra observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Jiang *et al.* 2010, ApJ, 712, 1147. CO observations of region.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5:  $S=18.5\pm 1.1$  Jy) including polarisation and review of flux densities.  
 Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.

**G41.5+0.4**

**RA:** 19<sup>h</sup>05<sup>m</sup>50<sup>s</sup>  
**Dec:** +07°46′

**1-GHz flux/Jy:** 1?  
**Spectral index:** ?

**Size/arcmin:** 10  
**Type:** S?

**Radio:** Partial clumpy shell, brighter to NE.

**References:**

Kaplan *et al.* 2002, ApJ, 566, 378. VLA at 332 MHz (20″:  $S=1.8\pm 0.4$  Jy).  
 Alves *et al.* 2012, MNRAS, 422, 2429. Radio observations.

**G42.0–0.1**

**RA:** 19<sup>h</sup>08<sup>m</sup>10<sup>s</sup>  
**Dec:** +08°00′

**1-GHz flux/Jy:** 0.5?  
**Spectral index:** ?

**Size/arcmin:** 8  
**Type:** S?

**Radio:** Irregular shell.

**References:**

Kaplan *et al.* 2002, ApJ, 566, 378. VLA at 332 MHz (20″ :  $S = 1.8 \pm 0.4$  Jy).  
 Alves *et al.* 2012, MNRAS, 422, 2429. Radio observations.

**G42.8+0.6**

**RA:** 19<sup>h</sup>07<sup>m</sup>20<sup>s</sup>  
**Dec:** +09°05′

**1-GHz flux/Jy:** 3?  
**Spectral index:** 0.5?

**Size/arcmin:** 24  
**Type:** S

Has been called G42.8+0.65.

**Radio:** Faint shell.

**Point sources:** Near soft gamma repeater, and young pulsar.

**References:**

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2′4″ :  $S = 1.5 \pm 0.2$  Jy), plus other flux densities.  
 Vasisht *et al.* 1994, ApJ, 431, L35. VLA at 327 MHz (3′2″×3′4″).  
 Hurley *et al.* 1996, ApJ, 463, L13. Observations of soft gamma repeater field.

Lorimer & Xilouris 2000, ApJ, 545, 385. Pulsar detection.  
 Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.  
 Kaplan *et al.* 2002, ApJ, 566, 378. VLA at 333 MHz (50″), and other observations of the region.

**G43.3–0.2**

**RA:** 19<sup>h</sup>11<sup>m</sup>08<sup>s</sup>  
**Dec:** +09°06′

**1-GHz flux/Jy:** 38  
**Spectral index:** 0.46

**Size/arcmin:** 4×3  
**Type:** S

W49B

**Radio:** Shell, brightest to the SE and W, near the HII region W49A.

**X-ray:** Centrally brightened, elongated E–W.

**Point sources:** Compact X-ray source.

**Distance:** HI absorption indicates 10 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 2.7 GHz (4′).  
 Downes & Wilson 1974, A&A, 34, 133. Effelsberg 100-m at 10.7 GHz (1′3″).  
 Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz (58″ :  $S = 9.0 \pm 0.7$  Jy).  
 Lockhart & Goss 1978, A&A, 67, 355. HI absorption.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6″).  
 Pye *et al.* 1984, MNRAS, 207, 649. Einstein observations, and VLA at 1.4 and 5 GHz (both 12″).  
 Smith *et al.* 1985, ApJ, 296, 469. EXOSAT spectrum.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to 30″ :  $S = 6.90 \pm 0.38$  Jy).  
 Moffett & Reynolds 1994, ApJ, 437, 705. VLA at 330 MHz (6′7″×7′7″ :  $S = 64.4$  Jy), 1.48 GHz (4′8″×5′2″ :  $S = 31.8$  Jy) and 4.85 GHz (4′0″×4′1″), including polarisation.  
 Fujimoto *et al.* 1995, PASJ, 47, L31. ASCA observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Hwang *et al.* 2000, ApJ, 532, 970. ROSAT image and ASCA spectroscopy.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.

Aharonian *et al.* 2001, A&A, 375, 1008. Limit on high energy  $\gamma$ -rays.  
 Brogan & Troland 2001, ApJ, 550, 799. VLA at 1.4 GHz (27″×24″ and 5″) for HI Zeeman splitting.  
 Lacey *et al.* 2001, ApJ, 559, 954. VLA at 74 MHz (26″×23″ :  $S = 55.6$  Jy) and 326 MHz (6′6″×6′2″ :  $S = 56.0$  Jy).  
 Kaplan *et al.* 2002, ApJ, 566, 378. VLA at 333 MHz (50″), and other observations of the region.  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Miceli *et al.* 2006, A&A, 453, 567. XMM observations.  
 Keohane *et al.* 2007, ApJ, 654, 938. IR and Chandra observations.  
 Ozawa *et al.* 2009, ApJ, 706, L71. Suzaku observations.  
 Abdo *et al.* 2010, ApJ, 722, 1303. Fermi observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5″ :  $S = 19.1 \pm 1.0$  Jy) including polarisation and review of flux densities.  
 Rodes-Roca 2013, A&A, 555, A115. IR of compact X-ray source.  
 Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.  
 Lopez *et al.* 2013, ApJ, 777, 145. Chandra spectroscopy.

**G43.9+1.6**

**RA:** 19<sup>h</sup>05<sup>m</sup>50<sup>s</sup>  
**Dec:** +10°30′

**1-GHz flux/Jy:** 9.0  
**Spectral index:** 0.5

**Size/arcmin:** 60?  
**Type:** S?

**Radio:** Large, poorly defined faint shell.

**Point sources:** Soft gamma repeater nearby.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′3).  
 Vasisht *et al.* 1994, ApJ, 431, L35. VLA at 327 MHz (3′2×3′4).  
 Hurley *et al.* 1996, ApJ, 463, L13. Observations of soft gamma

repeater field.  
 Kaplan *et al.* 2002, ApJ, 566, 378. VLA at 333 MHz (50′), and other observations of the region.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S = 4.55 \pm 0.24$  Jy) including polarisation and review of flux densities.

**G45.7–0.4**

**RA:** 19<sup>h</sup>16<sup>m</sup>25<sup>s</sup>  
**Dec:** +11°09′

**1-GHz flux/Jy:** 4.2?  
**Spectral index:** 0.4?

**Size/arcmin:** 22  
**Type:** S

**Radio:** Shell, brightest to the SE, poorly defined to NW.

**References:**

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2′4 :  $S = 2.6 \pm 0.3$  Jy), plus other flux densities.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G46.8–0.3**

(HC30)

**RA:** 19<sup>h</sup>18<sup>m</sup>10<sup>s</sup>  
**Dec:** +12°09′

**1-GHz flux/Jy:** 17  
**Spectral index:** 0.54

**Size/arcmin:** 17×13  
**Type:** S

Has been called G46.6–0.2.

**Radio:** Shell, two bright arcs to NNW and SSE.

**Distance:** H<sub>i</sub> absorption suggests 6.8–8.8 kpc.

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5′ :  $S = 9.8 \pm 0.9$  Jy), and 37-m at 1.7 GHz ( $S = 14.5 \pm 5.5$  Jy).  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S = 20.3$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 7.1$  Jy).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430\text{ MHz}} = 46 \pm 21$  Jy.  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′8 :  $S = 5.9 \pm 0.6$  Jy).

Sato 1979, ApL, 20, 43. H<sub>i</sub> observations.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (58′′×53′′ :  $S = 13.3 \pm 0.1$  Jy).  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S = 7.02 \pm 0.18$  Jy) including polarisation and review of flux densities.

**G49.2–0.7**

(W51)

**RA:** 19<sup>h</sup>23<sup>m</sup>50<sup>s</sup>  
**Dec:** +14°06′**1-GHz flux/Jy:** 160?  
**Spectral index:** 0.3?**Size/arcmin:** 30  
**Type:** S?**Radio:** In complex region, parameters uncertain.**Optical:** Some diffuse emission possibly associated.**X-ray:** Elongated east–west.**Distance:** Association with CO gives 6 kpc. H<sub>I</sub> suggest 4.3 kpc.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Parkes 64-m at 5 GHz (4').  
 Sato 1973, PASJ, 25, 135. H<sub>I</sub> absorption.  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5'),  $S = 51.5 \pm 3.2$  Jy, for the non-thermal component, but probably confused.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'6).  
 Seward 1990, ApJS, 73, 781. Einstein observations.  
 Copetti & Schmidt 1991, MNRAS, 250, 127. 151 MHz observations.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'1×3'5).  
 Subrahmanyan & Goss 1995, MNRAS, 275, 755. VLA at 330 MHz (1'1).  
 Koo *et al.* 1995, ApJ, 447, 211. ROSAT observations.  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. OH masers.  
 Koo & Moon 1997, ApJ, 475, 194. Arecibo (3') and VLA (40"×42") at 1.4 GHz for H<sub>I</sub>.  
 Koo & Moon 1997, ApJ, 485, 263. NRAO 12-m CO and HCO<sup>+</sup> observations.

Brogan *et al.* 2000, ApJ, 537, 875. VLA at 1.7 GHz for OH Zeeman splitting.  
 Mavromatakis *et al.* 2001, A&A, 370, 265. Optical observations.  
 Koo *et al.* 2002, AJ, 123, 1629. ASCA observations.  
 Koo *et al.* 2005, ApJ, 633, 946. Chandra observations.  
 Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity H<sub>I</sub>.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Abdo *et al.* 2009, ApJ, 706, L1. Fermi observations.  
 Koo *et al.* 2010, AJ, 140, 262. H<sub>I</sub> Zeeman splitting observations.  
 Ceccarelli *et al.* 2011, ApJ, 740, L4. Molecular line observations of region.  
 Aleksić *et al.* 2012, A&A, 541, A13.  $\gamma$ -ray observations.  
 Hanabata *et al.* 2013, PASJ, 65, 42. Suzaku observations.  
 Tian & Leahy 2013, ApJ, 769, L17. H<sub>I</sub> observations of region.  
 Brogan *et al.* 2013, ApJ, 771, 91. VLA at 74 MHz (84"×92") and 320 MHz (33"×35"), plus OH, molecular line and other observations.  
 Park *et al.* 2013, ApJ, 777, 14. Arecibo of H<sub>I</sub> in region.

**G53.6–2.2**

3C400.2, NRAO 611

**RA:** 19<sup>h</sup>38<sup>m</sup>50<sup>s</sup>  
**Dec:** +17°14′**1-GHz flux/Jy:** 8  
**Spectral index:** 0.50**Size/arcmin:** 33×28  
**Type:** S

Has been called G53.7–2.2.

**Radio:** Ring of emission, with extension to NW.**Optical:** Filaments and diffuse emission.**X-ray:** Centrally brightened, offset to NW.**Distance:** Association with H<sub>I</sub> gives 2.8 kpc.**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5' :  $S = 5.3 \pm 0.6$  Jy).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 4.8 \pm 0.3$  Jy).  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3' :  $S = 11.7$  Jy).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430 \text{ MHz}} = 20 \pm 10$  Jy,  $S_{318 \text{ MHz}} = 20 \pm 3.6$  Jy.  
 Goss *et al.* 1975, A&A, 43, 459. WSRT at 610 MHz (1'×3' :  $S = 13.2 \pm 1.6$  Jy).  
 Sabbadin & d'Odorico 1976, A&A, 49, 119. Optical spectra.  
 van den Bergh 1978, ApJS, 38, 119. Optical observations.  
 Rosado 1983, RMxAA, 8, 59. Optical spectra.  
 Blair & Long 1988, PASP, 100, 461. Optical imaging and spectroscopy.  
 see also: Blair & Long 1988, PASP, 100, 651. Erratum.  
 Long *et al.* 1991, ApJ, 373, 567. Einstein and optical observa-

tions.  
 Winkler *et al.* 1993, ApJ, 405, 608. Optical imaging.  
 Dubner *et al.* 1994, AJ, 108, 207. VLA at 327 MHz (59") and 1.49 GHz (52"), plus X-rays.  
 Saken *et al.* 1995, ApJ, 443, 231. ROSAT observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Giacani *et al.* 1998, A&AS, 133, 61. DRAO at 1.4 GHz for H<sub>I</sub> studies, including distance.  
 Yoshita *et al.* 2001, PASJ, 53, 93. ASCA observations, and spectral comparison with ROSAT.  
 Ambrocio-Cruz *et al.* 2006, RMxAA, 42, 241. Optical imaging and spectroscopy.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5 :  $S = 4.00 \pm 0.22$  Jy) including polarisation and review of flux densities.

**G54.1+0.3**

**RA:** 19<sup>h</sup>30<sup>m</sup>31<sup>s</sup>  
**Dec:** +18°52′

**1-GHz flux/Jy:** 0.5  
**Spectral index:** 0.1

**Size/arcmin:** 12?  
**Type:** C?

**Radio:** Filled-centre core, with faint diffuse emission.

**X-ray:** Centrally concentrated, with more extended diffuse emission.

**Point sources:** Central pulsar.

**Distance:** H<sub>I</sub> absorption suggests 4.5–9 kpc, association with CO suggest 8.2 kpc.

**References:**

Green 1985, MNRAS, 216, 691. Radio at 2.7 GHz (7''×20'').  
 Reich *et al.* 1985, A&A, 151, L10. Effelsberg 100-m at 4.75 GHz (2'4'': S=0.37±0.04 Jy)  
 Velusamy & Becker 1988, AJ, 95, 1162. VLA at 1.4 (14'': S=0.48±0.03 Jy), 1.6 (14'': S=0.42±0.03 Jy) and 5 GHz (5'': S=0.33±0.02 Jy), Ooty at 327 MHz (S=0.50±0.08 Jy), plus review of flux densities.  
 Seward 1989, AJ, 97, 481. Einstein observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Lu *et al.* 2001, A&A, 370, 570. ROSAT and ASCA observations.  
 Lu *et al.* 2002, ApJ, 568, L49. Chandra observations.  
 Camilo *et al.* 2002, ApJ, 574, L71. Pulsar detection.

Kaplan & Moon 2006, ApJ, 644, 1056. IR upper limit for pulsar.  
 Leahy *et al.* 2008, AJ, 136, 1477. VGPS at 1.4 GHz (1') including H<sub>I</sub>.  
 Koo *et al.* 2008, ApJ, 673, L147. AKARI observations of surroundings.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.  
 Bocchino *et al.* 2010, A&A, 520, A71. XMM and Suzaku observations.  
 Lang *et al.* 2010, ApJ, 709, 1125. VLA at 1.4 GHz (6''6×6''8), 4.7 GHz (3''2×3''3), and 8.2 GHz (3''0×3''2) and Spitzer observations.  
 Acciari *et al.* 2010, ApJ, 719, L69. γ-ray observations.  
 Lee *et al.* 2012, JKAS, 45, 117. CO observations of region.

**G54.4–0.3**

**RA:** 19<sup>h</sup>33<sup>m</sup>20<sup>s</sup>  
**Dec:** +18°56′

**1-GHz flux/Jy:** 28  
**Spectral index:** 0.5

**Size/arcmin:** 40  
**Type:** S

(HC40)

Has been called G54.5–0.3.

**Radio:** Shell, in complex region.

**Optical:** Faint filaments.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5'': S=34.4±5.0 Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'6').  
 Caswell 1985, AJ, 90, 1224. DRAO at 1.4 GHz (1'3×2'6': S=18±4 Jy).  
 Velusamy *et al.* 1986, JApA, 7, 105. WSRT at 609 MHz (50''×191'' smoothed to 100''×200'').

Junkes *et al.* 1992, A&AS, 96, 1. Surrounding CO.  
 Junkes *et al.* 1992, A&A, 261, 289. Nearby IRAS sources.  
 Boumis *et al.* 2005, A&A, 443, 175. Optical observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity H<sub>I</sub>.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Park *et al.* 2013, ApJ, 777, 14. Arecibo of H<sub>I</sub> in region.

**G55.0+0.3**

**RA:** 19<sup>h</sup>32<sup>m</sup>00<sup>s</sup>  
**Dec:** +19°50′

**1-GHz flux/Jy:** 0.5?  
**Spectral index:** 0.5?

**Size/arcmin:** 20×15?  
**Type:** S

Has been called G55.2+0.5.

**Radio:** Faint, partial shell.

**Point sources:** Old pulsar nearby.

**Distance:** Association with H<sub>I</sub> features implies 14 kpc.

**References:**

Matthews *et al.* 1998, ApJ, 493, 312. WSRT at 327 MHz (1'0×2'9': S=0.98±0.15 Jy), DRAO at 1.4 GHz (1'0×2'9': S=0.25±0.12 Jy), plus H<sub>I</sub> observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G55.7+3.4**

**RA:** 19<sup>h</sup>21<sup>m</sup>20<sup>s</sup>  
**Dec:** +21°44′

**1-GHz flux/Jy:** 1?  
**Spectral index:** 0.3?

**Size/arcmin:** 23  
**Type:** S

**Radio:** Incomplete shell.

**Point sources:** Old pulsar within the boundary of the remnant.

**References:**

Goss *et al.* 1977, A&A, 61, 93. WSRT observations at 610 MHz (57″×156″:  $S = 1.9 \pm 0.2$  Jy) and 1415 MHz (27″×72″:  $S = 1.0 \pm 0.1$  Jy).  
 Bhatnagar *et al.* 2011, ApJ, 739, L20. VLA at 1.3 to 1.9 GHz

(30″).  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S = 0.52 \pm 0.03$  Jy) including polarisation and review of flux densities.

**G57.2+0.8**

**RA:** 19<sup>h</sup>34<sup>m</sup>59<sup>s</sup>  
**Dec:** +21°57′

**1-GHz flux/Jy:** 1.8  
**Spectral index:** 0.62

(4C21.53)  
**Size/arcmin:** 12?  
**Type:** S?

**Radio:** Extended non-thermal arc.

**Point sources:** Near the millisecond pulsar, but not thought to be related.

**References:**

Sieber & Seiradakis 1984, A&A, 130, 257. Effelsberg 100-m at 1.4 GHz (8′8 : 1.34±0.1), 2.7 GHz (4′3 : 0.86±0.1), plus other surveys of the area.  
 Caswell *et al.* 1985, AJ, 90, 488. DRAO at 1.4 GHz (1′×3′).  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observa-

tions at 14 to 18 GHz.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S = 0.74 \pm 0.04$  Jy) including polarisation and review of flux densities.

**G59.5+0.1**

**RA:** 19<sup>h</sup>42<sup>m</sup>33<sup>s</sup>  
**Dec:** +23°35′

**1-GHz flux/Jy:** 3?  
**Spectral index:** ?

**Size/arcmin:** 15  
**Type:** S

Has been called G59.6+0.1.

**Radio:** Incomplete shell.

**Optical:** Diffuse shell.

**References:**

Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz (1′0×2′5 :  $S = 5.1 \pm 0.2$  Jy), and northern sky survey at 4.9 GHz.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

Gök *et al.* 2008, Ap&SS, 318, 207. Optical observations.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.  
 Xu & Wang 2012, A&A, 543, A24. CO observations of SE.

**G59.8+1.2**

**RA:** 19<sup>h</sup>38<sup>m</sup>55<sup>s</sup>  
**Dec:** +24°19′

**1-GHz flux/Jy:** 1.5  
**Spectral index:** 0.0

**Size/arcmin:** 20×16?  
**Type:** ?

Has been called G59.7+1.2.

**Radio:** Poorly defined source.

**Optical:** Faint diffuse emission and filaments.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4′3), including polarisation.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′3).

Boumis *et al.* 2005, A&A, 443, 175. Optical observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5 :  $S = 1.43 \pm 0.08$  Jy) including polarisation and review of flux densities.

**G63.7+1.1**

**RA:** 19<sup>h</sup>47<sup>m</sup>52<sup>s</sup>  
**Dec:** +27°45′

**1-GHz flux/Jy:** 1.8  
**Spectral index:** 0.24

**Size/arcmin:** 8  
**Type:** F

**Radio:** Centrally brightened, with core.

**References:**

Wallace *et al.* 1997, AJ, 114, 2068. WSRT at 1.4 GHz (14′×26′ :  $S=1.63$  Jy), DRAO at 1.4 GHz (smoothed to 2′), plus review of flux densities and other observations.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observa-

tions at 14 to 18 GHz.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 :  $S=1.12\pm0.06$  Jy) including polarisation and review of flux densities.

**G64.5+0.9**

**RA:** 19<sup>h</sup>50<sup>m</sup>25<sup>s</sup>  
**Dec:** +28°16′

**1-GHz flux/Jy:** 0.15?  
**Spectral index:** 0.5

**Size/arcmin:** 8  
**Type:** S?

**Radio:** Shell with central source.

**References:**

Hurley-Walker *et al.* 2009, MNRAS, 398, 249. Radio identification.

**G65.1+0.6**

**RA:** 19<sup>h</sup>54<sup>m</sup>40<sup>s</sup>  
**Dec:** +28°35′

**1-GHz flux/Jy:** 5.5  
**Spectral index:** 0.61

**Size/arcmin:** 90×50  
**Type:** S

**Radio:** Large, faint shell.

**Point sources:** Old pulsar nearby.

**Distance:** Possible association with H<sub>I</sub> suggests 9 kpc.

**References:**

Landecker *et al.* 1990, A&A, 232, 207. DRAO at 408 MHz (3′.5×7′.0 :  $S=9.5\pm0.1$  Jy), and 1.4 GHz (1′.0×2′.0 :  $S=5.4\pm1.0$  Jy).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Tian & Leahy 2006, A&A, 455, 1053. CGPS at 408 MHz (2′.8×5′.9 :  $S=8.6\pm0.8$  Jy) and 1.4 GHz (0′.8×1′.7 :  $S=4.9\pm0.5$  Jy) including H<sub>I</sub>.

Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz (~ 3′ :  $S=9.1\pm1.0$  Jy) and 1420 MHz (~ 1′ :  $S=3.9\pm0.5$  Jy), including review of flux densities.  
 Aleksić *et al.* 2010, ApJ, 725, 1629. Fermi observations.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′.5 :  $S=3.2\pm0.3$  Jy), including polarisation and review of flux densities.

**G65.3+5.7**

**RA:** 19<sup>h</sup>33<sup>m</sup>00<sup>s</sup>  
**Dec:** +31°10′

**1-GHz flux/Jy:** 42  
**Spectral index:** 0.6

**Size/arcmin:** 310×240  
**Type:** S?

Has been called G65.2+5.7.

**Radio:** Large, faint ring, near S91 and S94.

**Optical:** Filamentary ring.

**X-ray:** Diffuse, centrally brightened.

**Distance:** Optical proper motions and velocities indicates 0.8 kpc.

**References:**

Gull *et al.* 1977, ApJ, 215, L69. Optical plates.  
 Reich *et al.* 1979, A&A, 72, 270. Effelsberg 100-m observations at 1.42 GHz (smoothed to 11′ :  $S=42.4\pm1.6$  Jy), estimate  $S_{408\text{ MHz}}=91\pm5$  Jy from previous sky survey.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Rosado 1981, ApJ, 250, 222. Optical interferometry.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Seward 1990, ApJS, 73, 781. Einstein observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Mavromatakis *et al.* 2002, A&A, 388, 355. Optical observations.

Boumis *et al.* 2004, A&A, 424, 583. Optical observations.  
 Shelton *et al.* 2004, ApJ, 615, 275. ROSAT observations.  
 Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.  
 Xiao *et al.* 2009, A&A, 503, 827. Effelsberg 100-m at 2.7 GHz (4′.4 :  $S=22\pm3$  Jy), and Urumqi 21-m at 4.8 GHz (9′.5 :  $S=16.8\pm1.8$  Jy) including polarisation and review of flux densities.  
 Gosachinskii 2010, AstL, 36, 260. H<sub>I</sub> observations.  
 Kim *et al.* 2010, ApJ, 722, 388. Far UV observations.

**G65.7+1.2**

**RA:** 19<sup>h</sup>52<sup>m</sup>10<sup>s</sup>  
**Dec:** +29°26′

**1-GHz flux/Jy:** 5.1  
**Spectral index:** varies

**DA 495**  
**Size/arcmin:** 22  
**Type:** F

Has mistakenly been called G55.7+1.2.

**Radio:** Centrally brightened with thick shell?

**X-ray:** Detected.

**Point sources:** Compact X-ray source near centre.

**Distance:** HI polarisation observations suggest 1.5 kpc.

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S' : S = 2.8 \pm 0.4$  Jy), and 37-m at 1.7 GHz ( $S = 4.4 \pm 0.5$  Jy), plus review of flux densities.  
 see also: Willis 1973, A&A, 27, 483. Erratum.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430 \text{ MHz}} = 8.7 \pm 4.9$  Jy,  $S_{318 \text{ MHz}} = 9.7 \pm 2.2$  Jy.  
 Landecker & Caswell 1983, AJ, 88, 1810. DRAO at 1.4 GHz ( $0'.9 \times 1'.5 : S = 4.4 \pm 0.2$  Jy).  
 Velusamy *et al.* 1989, JApA, 10, 161. Ooty at 327 MHz ( $36'' \times 64''$ ), WSRT at 610 MHz ( $62''$ ) and VLA at 1.4 GHz ( $36''$  and  $12''$ ), including IRAS imaging.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Kothes *et al.* 2004, ApJ, 607, 855. HI polarisation absorption.

Arzoumanian *et al.* 2004, ApJ, 610, L101. ROSAT and ASCA observations of compact source.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 6.5 \pm 0.6$  Jy) and 1420 MHz ( $\sim 1' : S = 4.0 \pm 0.2$  Jy), including polarisation and review of flux densities.  
 Arzoumanian *et al.* 2008, ApJ, 687, 505. Chandra observations.  
 Kothes *et al.* 2008, ApJ, 687, 516. CGPS at 408 MHz ( $2'.9 \times 6'.0 : S = 6.5 \pm 0.5$  Jy) and 1.4 GHz ( $0'.82 \times 1'.75 : S = 4.0 \pm 0.2$  Jy), Effelsberg 100-m at 4.85 GHz ( $2'.45 : S = 1.6 \pm 0.1$  Jy) and 10.55 GHz (smoothed to  $2'.45 : S = 1.1 \pm 0.1$  Jy), plus review of flux densities.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9'.5 : S = 1.95 \pm 0.10$  Jy) including polarisation and review of flux densities.

**G65.8–0.5**

**RA:** 19<sup>h</sup>59<sup>m</sup>20<sup>s</sup>  
**Dec:** +28°38′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 10×6?  
**Type:** S

**Radio:** Arc in W.

**Optical:** Diffuse shell, brighter in W.

**References:**

Sabin *et al.* 2013, MNRAS, 431, 279. H $\alpha$  and radio survey observations.

**G66.0–0.0**

**RA:** 19<sup>h</sup>57<sup>m</sup>50<sup>s</sup>  
**Dec:** +29°03′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 31×25?  
**Type:** S

**Radio:** Some emission in N.

**Optical:** Incomplete shell.

**References:**

Sabin *et al.* 2013, MNRAS, 431, 279. H $\alpha$  and radio survey observations.

**G67.6+0.9**

**RA:** 19<sup>h</sup>57<sup>m</sup>45<sup>s</sup>  
**Dec:** +30°53′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 50×45?  
**Type:** S

**Radio:** Arc in S.

**Optical:** Filamentary shell.

**References:**

Sabin *et al.* 2013, MNRAS, 431, 279. H $\alpha$  and radio survey observations.



**G67.7+1.8**

**RA:** 19<sup>h</sup>54<sup>m</sup>32<sup>s</sup>  
**Dec:** +31°29′

**1-GHz flux/Jy:** 1.0  
**Spectral index:** 0.61

**Size/arcmin:** 15×12  
**Type:** S

**Radio:** Double arc shell.

**Optical:** Filaments in N.

**X-ray:** Detected.

**Point sources:** Compact X-ray source.

**References:**

Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz (1′9×1′0:  $S = 1.9 \pm 0.1$  Jy), and northern sky survey at 4.9 GHz ( $S = 0.42 \pm 0.05$  Jy).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Mavromatakis *et al.* 2001, A&A, 370, 265. Optical observations.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S = 1.1 \pm 0.1$  Jy) and 1420 MHz ( $\sim 1'$ :  $S = 0.68 \pm 0.04$  Jy),

including polarisation and review of flux densities.  
 Gök *et al.* 2008, Ap&SS, 318, 207. Optical observations.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.  
 Hui & Becker 2009, A&A, 494, 1005. Chandra observations.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5:  $S = 0.30 \pm 0.03$  Jy) including polarisation and review of flux densities.

**G67.8+0.5**

**RA:** 20<sup>h</sup>00<sup>m</sup>00<sup>s</sup>  
**Dec:** +30°51′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 7×5  
**Type:** ?

**Radio:** Poorly resolved arc.

**Optical:** Diffuse shell, brighter to W.

**References:**

Sabin *et al.* 2013, MNRAS, 431, 279. H $\alpha$  and radio survey observations.

**G68.6–1.2**

**RA:** 20<sup>h</sup>08<sup>m</sup>40<sup>s</sup>  
**Dec:** +30°37′

**1-GHz flux/Jy:** 1.1  
**Spectral index:** 0.2

**Size/arcmin:** 23  
**Type:** ?

**Radio:** Faint, poorly defined source.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4′3), including polarisation.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′3).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 1420 MHz ( $\sim 1'$ :  $S = 0.57 \pm 0.08$  Jy), including review of flux densities  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5:  $S = 0.80 \pm 0.04$  Jy) including polarisation and review of flux densities.

**G69.0+2.7**

CTB 80

**RA:** 19<sup>h</sup>53<sup>m</sup>20<sup>s</sup>  
**Dec:** +32°55′**1-GHz flux/Jy:** 120?  
**Spectral index:** varies**Size/arcmin:** 80?  
**Type:** ?

An association with a SN in AD1408 has been suggested. Has been called G68.8+2.8. Is it a SNR?

**Radio:** Compact core, flat spectrum plateau, and steeper spectrum extensions, with spectral break?

**Optical:** Expanding nebulosity near centre, with filaments to the SW and far NE.

**X-ray:** Diffuse emission with compact source.

**Point sources:** Pulsar at western edge of core.

**Distance:** HI observations suggest 1.5 kpc.

**References:**

- Angerhofer *et al.* 1981, A&A, 94, 313. WSRT at 610 MHz (56''×103'') 1.4 GHz (24''×44'') and 5 GHz (7''×13''), plus optical.
- Becker *et al.* 1982, ApJ, 255, 557. X-ray observations.
- Sofue *et al.* 1983, PASJ, 35, 437. NRO 45-m at 10.2 GHz (2'7).
- Velusamy & Kundu 1983, JApA, 4, 253. VLA of compact sources.
- Blair *et al.* 1984, ApJ, 282, 161. Optical images and spectra.
- Wang & Seward 1984, ApJ, 285, 607. Einstein observations.
- Strom *et al.* 1984, A&A, 139, 43. Radio observations of flat spectrum component, VLA 5 GHz (1'7) and 1.4 GHz.
- Mantovani *et al.* 1985, A&A, 145, 50. Bologna at 408 MHz (2'6×4'9:  $S=67.5\pm 10.5$  Jy), Effelsberg 100-m at 1.41 (9':  $S=62\pm 9$  Jy), 1.72 (7'6:  $S=66\pm 5$  Jy), 2.7 (4'5:  $S=52\pm 4$  Jy) and 4.75 GHz (2'4:  $S=44\pm 3.3$  Jy), plus review of flux densities.
- Kulkarni *et al.* 1988, Nature, 331, 50. Pulsar detection.
- Angelini *et al.* 1988, ApJ, 330, L43. EXOSAT spectra.
- Fesen *et al.* 1988, Nature, 334, 229. IRAS of surrounding shell.
- Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4'3), including polarisation.
- Whitehead *et al.* 1989, MNRAS, 237, 1109. Optical of core.
- Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of flux densities.
- Hester & Kulkarni 1989, ApJ, 340, 362. Optical imaging and spectroscopy.
- Koo *et al.* 1990, ApJ, 364, 178. Large, expanding HI shell.
- Greidanus & Strom 1990, A&A, 240, 376. Optical kinematics of core.
- Koo *et al.* 1993, ApJ, 417, 196. VLA at 1.4 GHz of surrounding

- HI (1'), plus IRAS.
- Safi-Harb *et al.* 1995, ApJ, 439, 722. ROSAT observations.
- Srinivasan 1997, ApJ, 489, 170.  $\gamma$ -ray observations of pulsar.
- Mavromatakis *et al.* 2001, A&A, 371, 300. Optical observations.
- Butler *et al.* 2002, A&A, 395, 845. HST detection of pulsar.
- Migliazzo *et al.* 2002, ApJ, 567, L141. Pulsar proper motion study.
- Castelletti *et al.* 2003, AJ, 126, 2114. GMRT at 240 and 618 MHz (26''×17'' and 10''×6'') and VLA at 324 and 1380 MHz (73''×63'' and 93''×78'').
- Moon *et al.* 2004, ApJ, 610, L33. Chandra and HST observations of core.
- Li *et al.* 2005, ApJ, 628, 931. Chandra observations of pulsar and surroundings.
- Golden *et al.* 2005, ApJ, 635, L153. High resolution radio observations of pulsar and surroundings.
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S=72\pm 7$  Jy) and 1420 MHz ( $\sim 1'$ :  $S=56\pm 5$  Jy), including polarisation and review of flux densities.
- Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity HI.
- Albert *et al.* 2007, ApJ, 669, 1143.  $\gamma$ -ray observations.
- Zeiger *et al.* 2008, ApJ, 674, 271. Proper motion of pulsar.
- Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9'5:  $S=36\pm 4$  Jy), including polarisation and review of flux densities.
- Leahy & Ranasinghe 2012, MNRAS, 423, 718. CGPS at 1.4 GHz, including HI, plus ROSAT observations.
- Park *et al.* 2013, ApJ, 777, 14. Arecibo of HI in region.

**G69.7+1.0****RA:** 20<sup>h</sup>02<sup>m</sup>40<sup>s</sup>  
**Dec:** +32°43′**1-GHz flux/Jy:** 2.0  
**Spectral index:** 0.7**Size/arcmin:** 16×14  
**Type:** S

**Radio:** Poorly resolved source.

**X-ray:** Detected.

**References:**

- Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.
- Junkes *et al.* 1988, LNP, 316, 134. Effelsberg 100-m at 2.7 GHz (4'3), including polarisation.
- Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'3).
- Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.
- Yoshita *et al.* 2000, PASJ, 52, 867. ROSAT and ASCA observa-

- tions.
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S=3.2\pm 0.4$  Jy) and 1420 MHz ( $\sim 1'$ :  $S=1.5\pm 0.1$  Jy), including review of flux densities.
- Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5:  $S=0.78\pm 0.07$  Jy) including polarisation and review of flux densities.

**G73.9+0.9****RA:** 20<sup>h</sup>14<sup>m</sup>15<sup>s</sup>**Dec:** +36°12′**1-GHz flux/Jy:** 9**Spectral index:** 0.23**Size/arcmin:** 27**Type:** S?**Radio:** Diffuse, centrally brightened to SW.**Optical:** Faint shell.**References:**Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2′4″:  $S=6.7\pm0.5$  Jy), plus other flux densities.

Chastenay &amp; Pineault 1988, IAUCo, 101, 297. DRAO at 408 MHz (3′5″×5′9″) and 1.4 GHz (1′0″×1′7″).

Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz (3′4″×5′8″:  $S=12.7\pm1.2$  Jy) and 1.4 GHz (1′0″×1′7″:  $S=7.4\pm1.0$  Jy).Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.Pineault *et al.* 1996, AJ, 112, 201. DRAO at 1.4 GHz (smoothed to 2′) for H $\alpha$ .Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

Mavromatakis 2003, A&amp;A, 398, 153. Optical observations.

Kotthes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S=10.0\pm1.7$  Jy) and 1420 MHz ( $\sim 1'$ :  $S=7.6\pm0.6$  Jy), including polarisation and review of flux densities.Sitnik 2010, ARep, 54, 317. H $\alpha$  and CO observations of region.Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′5″:  $S=6.2\pm0.3$  Jy) including polarisation and review of flux densities.Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G74.0–8.5**

Cygnus Loop

**RA:** 20<sup>h</sup>51<sup>m</sup>00<sup>s</sup>  
**Dec:** +30°40′**1-GHz flux/Jy:** 210  
**Spectral index:** varies**Size/arcmin:** 230×160  
**Type:** S

Has been suggested that this is two overlapping remnants.

**Radio:** Shell, brightest to the NE, with fainter breakout region to S, with spectral variations.

**Optical:** Large filamentary loop, brightest to the NE, not well defined to the S or W.

**X-ray:** Shell in soft X-rays.

**Point sources:** Several compact radio sources within the boundary of the remnant, including CL4, plus X-ray sources in S.

**Distance:** Optical proper motion and shock velocity gives 0.44 kpc.

**References:**

- Green 1990, AJ, 100, 1927. DRAO at 408 MHz (3′.3×6′.7) for spectral index study, plus X-ray and optical.
- Graham *et al.* 1991, AJ, 101, 175. Shocked molecular H outside rim in NE.
- Shull & Clarke 1991, PASP, 103, 811. Optical spectroscopy of nearside filaments.
- Fesen *et al.* 1992, AJ, 104, 719. H $\alpha$  imagery.
- Long *et al.* 1992, ApJ, 400, 214. Optical of Balmer dominated filament.
- Arendt *et al.* 1992, ApJ, 400, 562. IRAS observations.
- Hester *et al.* 1994, ApJ, 420, 721. H $\alpha$ , [OIII] and other optical observations of Balmer dominated filaments in NE.
- Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.
- Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.
- Levenson *et al.* 1997, ApJ, 484, 304. ROSAT observations.
- Leahy *et al.* 1997, AJ, 114, 2081. DRAO at 1.4 GHz (1′×2′), including polarisation.
- Leahy & Roger 1998, ApJ, 505, 784. DRAO at 1.4 GHz (1′.0×1′.9) and 408 MHz (3′.4×6′.9), for spectral index studies in comparison with other radio observations.
- Levenson *et al.* 1998, ApJS, 118, 541. Optical images.
- Roger *et al.* 1999, A&AS, 137, 7. 22 MHz flux density ( $S = 1400 \pm 400$  Jy).
- Bohigas *et al.* 1999, ApJ, 518, 324. Optical spectroscopy of surroundings.
- Levenson *et al.* 1999, ApJ, 526, 874. ROSAT images.
- Blair *et al.* 1999, AJ, 118, 942. HST observations, for distance.
- Aschenbach & Leahy 1999, A&A, 341, 602. ROSAT image, and comparison with radio.
- Danforth *et al.* 2000, AJ, 119, 2319. UV, optical and X-ray comparison of selected regions.
- Miyata *et al.* 2001, ApJ, 550, 1023. ASCA observations of compact X-ray sources.
- Miyata & Tsunemi 2001, ApJ, 552, 624. ASCA spectroscopy of regions in N and E.
- Ghavamian *et al.* 2001, ApJ, 547, 995. Optical spectroscopy.
- Danforth *et al.* 2001, AJ, 122, 938. Far-UV spectroscopy, H $\alpha$  and other optical observations of NE region.
- Levenson & Graham 2001, ApJ, 559, 948. HST of SE region.
- Uyaniker *et al.* 2002, A&A, 389, L61. Effelsberg 100-m at 2.7 GHz (4′.3) including polarisation, and comparison with ROSAT data.
- Leahy 2002, AJ, 123, 2689. DRAO at 1.4 GHz (4′×2′) for Hi.
- Blair *et al.* 2002, ApJS, 140, 367. UV spectroscopy.
- Welsh *et al.* 2002, A&A, 391, 705. Optical absorption to background stars.
- Sankrit & Blair 2002, ApJ, 565, 297. UV observations of NE filament.
- Levenson *et al.* 2002, ApJ, 576, 798. Chandra observations of W edge.
- Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′.5:  $S = 184 \pm 18$  Jy).
- Leahy 2004, MNRAS, 351, 385. Chandra observations of SW.
- Uyaniker *et al.* 2004, A&A, 426, 909. Effelsberg 100-m at 2.7 GHz (4′.3), with comparison with other data for spectral index studies.
- Blair *et al.* 2005, AJ, 129, 2268. HST of outer filaments.
- Leahy 2005, AJ, 130, 165. DRAO at 1.4 GHz of SE.
- Levenson & Graham 2005, ApJ, 622, 366. Chandra observations of knot in SE.
- Sun *et al.* 2006, A&A, 447, 937. Urumqi 25-m at 4.8 GHz (9′.5:  $S = 90 \pm 9$  Jy), with comparisons with other data for spectral index studies.
- Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.
- Seon *et al.* 2006, ApJ, 644, L175. Far UV observations.
- Sankrit *et al.* 2007, AJ, 133, 1383. UV observations of part.
- Tsunemi *et al.* 2007, ApJ, 671, 1717. XMM observations of NE to SW.
- Miyata *et al.* 2007, PASJ, 59, S163. Suzaku observations of NE.
- Nemes *et al.* 2008, ApJ, 675, 1293. XMM observations of NE.
- Katsuda *et al.* 2008, ApJ, 680, 1198. Chandra observations of NE.
- Uchida *et al.* 2008, ApJ, 688, 1102. XMM observations.
- Uchida *et al.* 2009, PASJ, 61, 503. Suzaku observations of N.
- Kimura *et al.* 2009, PASJ, 61, S137. Suzaku observations from NE to SW.
- Tsunemi *et al.* 2009, PASJ, 61, S147. Suzaku observations of SE.
- Kosugi *et al.* 2010, PASJ, 62, 1035. Suzaku observations of SE.
- Sankrit *et al.* 2010, ApJ, 712, 1092. Spitzer observations.
- McEntaffer & Brantseg 2011, ApJ, 730, 99. Chandra observations of E.
- Katagiri *et al.* 2011, ApJ, 741, 44. Fermi observations.
- Katsuda *et al.* 2012, ApJ, 754, L7. Suzaku and XMM observations.
- Leahy & Hassan 2013, ApJ, 764, 55. Suzaku and XMM observations of SW.
- Oakley *et al.* 2013, ApJ, 766, 51. X-ray spectroscopy.

**G74.9+1.2**

CTB 87

**RA:** 20<sup>h</sup>16<sup>m</sup>02<sup>s</sup>  
**Dec:** +37°12′**1-GHz flux/Jy:** 9  
**Spectral index:** varies**Size/arcmin:** 8×6  
**Type:** F**Radio:** Filled-centre, with high polarisation and high frequency turnover.**X-ray:** Centrally brightened.**Point sources:** Compact X-ray source in SE.**Distance:** H<sub>i</sub> absorption indicates 12 kpc, optical extinction gives 6.1 kpc.**References:**

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S_{430\text{ MHz}} = 12.2 \pm 9.7$  Jy,  $S_{318\text{ MHz}} = 17.7 \pm 5.0$  Jy.  
 Weiler & Shaver 1978, A&A, 70, 389. WSRT at 610 MHz ( $57'' \times 94'' : S = 9.1 \pm 1.2$  Jy), 1.4 ( $24'' \times 40'' : S = 8.7 \pm 1.2$  Jy) and 5 GHz ( $24'' \times 40'' : S = 5.6 \pm 1.3$  Jy).  
 Geldzahler *et al.* 1980, A&A, 84, 237. Effelsberg 100-m at 2.7 GHz ( $4.4 : S = 7.6 \pm 0.5$  Jy).  
 Wilson 1980, ApJ, 241, L19. Einstein observations.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT H<sub>i</sub> absorption of nearby compact source.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (smoothed to  $40'' : S = 1.47 \pm 0.19$  Jy).  
 Green & Gull 1989, MNRAS, 237, 555. VLA at 1.4 GHz ( $1.2 \times 1.4$ ) including H<sub>i</sub>.  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz, plus review of flux densities.  
 Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz ( $3.4 \times 5.8 : S = 11.6 \pm 0.4$  Jy) and 1.4 GHz ( $1.0 \times 1.7 : S = 7.2 \pm 0.3$  Jy).  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz ( $3.5 \times 5.2 : S = 13.3 \pm 0.8$  Jy) and Effelsberg 100-m at 4.8 GHz

( $S = 7.5 \pm 0.7$  Jy).  
 Wallace *et al.* 1994, A&A, 286, 565. H<sub>i</sub> of surroundings.  
 Cho *et al.* 1994, AJ, 108, 634. CO of adjacent molecular clouds.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Wallace *et al.* 1997, A&A, 317, 212. DRAO at 408 MHz ( $3.4 \times 5.5$ ) and 1.4 GHz ( $1.0 \times 1.6$ ) including H<sub>i</sub> (smoothed to  $2'$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Kothes *et al.* 2003, ApJ, 588, 852. CGPS at 1.4 GHz ( $1.6 \times 1'$ ) including H<sub>i</sub>, plus CO observations.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 11.9 \pm 0.9$  Jy) and 1420 MHz ( $\sim 1' : S = 7.1 \pm 1.1$  Jy), including polarisation and review of flux densities.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.  
 Sitnik 2010, ARep, 54, 317. H $\alpha$  and CO observations of region.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5 : S = 6.4 \pm 0.4$  Jy) including polarisation and review of flux densities.  
 Matheson *et al.* 2013, ApJ, 774, 33. Chandra observations.

**G76.9+1.0****RA:** 20<sup>h</sup>22<sup>m</sup>20<sup>s</sup>  
**Dec:** +38°43′**1-GHz flux/Jy:** 2?  
**Spectral index:** ?**Size/arcmin:** 9  
**Type:** C**Radio:** Bipolar shell.**Point sources:** Central pulsar.**References:**

Landecker *et al.* 1993, A&A, 276, 522. VLA at 1.49 GHz ( $14''$ ), 4.86 GHz ( $13'' \times 16''$ ) and 8.55 GHz ( $11'' \times 12''$ ), including polarisation and review of flux densities.  
 Landecker *et al.* 1997, A&AS, 123, 199. Miyun at 232-MHz ( $3.8 \times 5.4$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 2.3 \pm 0.2$  Jy) and 1420 MHz ( $\sim 1' : S = 1.35 \pm 0.07$  Jy), including polarisation and review of flux densities.  
 Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observa-

tions at 14 to 18 GHz.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5 : S = 0.79 \pm 0.07$  Jy) including polarisation and review of flux densities.  
 Marthi *et al.* 2011, MNRAS, 416, 2560. GMRT at 618 MHz ( $51'' \times 54''$ ), 1160 MHz ( $2.2 \times 3.4$ ), and Chandra observations of central source.  
 Arzoumanian *et al.* 2011, ApJ, 739, 39. Pulsar detection.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G78.2+2.1**

**RA:** 20<sup>h</sup>20<sup>m</sup>50<sup>s</sup>  
**Dec:** +40°26′

**1-GHz flux/Jy:** 320  
**Spectral index:** 0.51

DR4,  $\gamma$  Cygni SNR

**Size/arcmin:** 60  
**Type:** S

Has been called G78.1+1.8.

**Radio:** In complex region (early catalogues refer to other proposed remnants in this region).

**Optical:** Faint filaments, spectra indicate a SNR superposed on a HII region.

**X-ray:** Weak emission from the SE of the remnant.

**Point sources:** X-ray pulsar at edge of remnant.

**Distance:** Associations with other objects suggests 1.7 to 2.6 kpc.

**References:**

Higgs *et al.* 1977, AJ, 82, 718. DRAO at 1.4 GHz ( $2' \times 3' : S = 270 \pm 40$  Jy) plus some 10 GHz ( $4'$ ) survey data, reveals true extent of remnant.  
 d'Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.  
 van den Bergh 1978, ApJS, 38, 119. Optical observations.  
 Landecker *et al.* 1980, A&AS, 39, 133. DRAO HI observations ( $2' \times 3'.1$ ).  
 Higgs *et al.* 1983, AJ, 88, 97. CO of surroundings.  
 Bohigas *et al.* 1983, RMxAA, 8, 155. Optical spectra, find thermal only.  
 Braun & Strom 1986, A&AS, 63, 345. WSRT HI observations.  
 Fukui & Tatamatsu 1988, IAUCo, 101, 261. CO observations of the vicinity ( $2'.7$ ).  
 Green 1989, MNRAS, 238, 737. OH observations.  
 Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz ( $3'.4 \times 5'.8 : S = 480 \pm 60$  Jy) and 1.4 GHz ( $1'.0 \times 1'.7 : S = 270 \pm 40$  Jy).  
 Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz ( $3'.5 \times 5'.2 : S = 540 \pm 40$  Jy) and Effelsberg 100-m at 4.8 GHz ( $S = 150 \pm 15$  Jy).  
 Esposito *et al.* 1996, ApJ, 461, 820. Associated  $\gamma$ -ray emission.  
 Brazier *et al.* 1996, MNRAS, 281, 1033.  $\gamma$ -ray and X-ray point source.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Zhang *et al.* 1997, A&A, 324, 641. Multi-frequency radio comparison.

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Roberts *et al.* 2001, ApJS, 133, 451. ASCA observations.  
 Uchiyama *et al.* 2002, ApJ, 571, 866. ASCA observations.  
 Mavromatakis 2003, A&A, 408, 237. Optical observations.  
 Bykov 2004, A&A, 427, L21. Hard X-ray observations.  
 Becker *et al.* 2004, ApJ, 615, 897. Chandra and other observations of compact sources.  
 Weisskopf *et al.* 2006, ApJ, 652, 387. Chandra and other observations of compact sources.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 500 \pm 35$  Jy) and 1420 MHz ( $\sim 1' : S = 226 \pm 19$  Jy), including review of flux densities.  
 Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity HI.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Ladouceur & Pineault 2008, A&A, 490, 197. CGPS at 408 MHz ( $2'.9 \times 4'.5$ ) and 1.4 GHz ( $0'.8 \times 1'.5$ ).  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz ( $9'.5 : S = 170 \pm 18$  Jy), including polarisation and review of flux densities.  
 Leahy *et al.* 2013, MNRAS, 436, 968. ROSAT and Chandra observations, and CGPS for HI.  
 Aliu *et al.* 2013, ApJ, 770, 93.  $\gamma$ -ray observations.  
 Lin *et al.* 2013, ApJ, 770, L9. Pulsar detection.

**G82.2+5.3**

**RA:** 20<sup>h</sup>19<sup>m</sup>00<sup>s</sup>  
**Dec:** +45°30′

**1-GHz flux/Jy:** 120?  
**Spectral index:** 0.5?

W63

**Size/arcmin:** 95  $\times$  65  
**Type:** S

Has been called G82.5+5.3.

**Radio:** Shell in the Cygnus X complex.

**Optical:** In complex region, but spectra indicate SNR filaments.

**X-ray:** Detected.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 59.0 \pm 3.5$  Jy).  
 Sabbadin 1976, A&A, 51, 159. Optical spectra.  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $6'.8$ ). Incomplete mapping.  
 Rosado & González 1981, RMxAA, 5, 93. Optical spectra.  
 Seward 1990, ApJS, 73, 781. Einstein observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz ( $14'.5 : S = 82.5 \pm 5.5$  Jy).

Uyaniker *et al.* 2003, ApJ, 585, 785. CGPS at 1.4 GHz ( $1'$ ) including polarisation, of part.  
 Mavromatakis *et al.* 2004, A&A, 415, 1051. ROSAT, ASCA and optical observations.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 144 \pm 12$  Jy) and 1420 MHz ( $\sim 1' : S = 93 \pm 5$  Jy), including review of flux densities.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz ( $9'.5 : S = 49 \pm 5$  Jy), including polarisation and review of flux densities.

**G83.0–0.3**

**RA:** 20<sup>h</sup>46<sup>m</sup>55<sup>s</sup>  
**Dec:** +42°52′

**1-GHz flux/Jy:** 1  
**Spectral index:** 0.4

**Size/arcmin:** 9×7  
**Type:** S

**Radio:** Incomplete shell.

**References:**

Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S = 1.2 \pm 0.3$  Jy) and 1420 MHz ( $\sim 1'$ :  $S = 0.8 \pm 0.1$  Jy), including polarisation and review of flux densities.

**G84.2–0.8**

**RA:** 20<sup>h</sup>53<sup>m</sup>20<sup>s</sup>  
**Dec:** +43°27′

**1-GHz flux/Jy:** 11  
**Spectral index:** 0.5

**Size/arcmin:** 20×16  
**Type:** S

**Radio:** Elongated shell, with a filament aligned with the major axis.

**X-ray:** Detected.

**Distance:** H I absorption suggests 6 kpc.

**References:**

Matthews *et al.* 1977, A&A, 55, 1. WSRT at 610 MHz ( $56'' \times 81''$ :  $S = 12.4 \pm 1.5$  Jy) and Effelsberg 100-m at 2.7 GHz ( $4.4$ :  $S = 6.8 \pm 1.3$  Jy).  
 Matthews & Shaver 1980, A&A, 87, 255. WSRT at 1415 MHz ( $23'' \times 32''$ ), and Effelsberg 100-m at 2.7 GHz ( $4.4$ :  $S = 5.6 \pm 0.5$  Jy).  
 Feldt & Green 1993, A&A, 274, 421. DRAO at 1.4 GHz ( $1' \times 1.5$ ), including H I, plus CO observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Uyaniker *et al.* 2003, ApJ, 585, 785. CGPS at 1.4 GHz ( $1'$ ) including polarisation.

Kaplan *et al.* 2004, ApJS, 153, 269. Chandra limits for any compact source.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S = 14.5 \pm 0.5$  Jy) and 1420 MHz ( $\sim 1'$ :  $S = 7.2 \pm 0.8$  Jy), including review of flux densities.  
 Leahy & Green 2012, ApJ, 760, 25. CGPS, including H I, plus Chandra observations.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G85.4+0.7**

**RA:** 20<sup>h</sup>50<sup>m</sup>40<sup>s</sup>  
**Dec:** +45°22′

**1-GHz flux/Jy:** ?  
**Spectral index:** 0.2

**Size/arcmin:** 24?  
**Type:** S

**Radio:** Faint, incomplete shell, within larger thermal shell.

**X-ray:** Centrally brightened.

**Distance:** H I observations suggest 3.5 kpc.

**References:**

Kothes *et al.* 2001, A&A, 376, 641. CGPS at 408 MHz ( $4.4 \times 2.8$ :  $S < 0.45$  Jy) and 1.4 GHz ( $1.1 \times 0.8$ ), plus H I, X-ray and optical data.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S = 2.9 \pm 0.5$  Jy) and 1420 MHz ( $\sim 1'$ :  $S = 2.3 \pm 0.2$  Jy),

including review of flux densities.  
 Jackson *et al.* 2008, ApJ, 674, 936. XMM and H I observations.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G85.9–0.6**

**RA:** 20<sup>h</sup>58<sup>m</sup>40<sup>s</sup>  
**Dec:** +44°53′

**1-GHz flux/Jy:** ?  
**Spectral index:** 0.2

**Size/arcmin:** 24  
**Type:** S

**Radio:** Faint, incomplete shell.

**Optical:** Diffuse shell.

**X-ray:** Centrally brightened.

**Distance:** H I observations suggest 4.8 kpc.

**References:**

Kothes *et al.* 2001, A&A, 376, 641. CGPS at 408 MHz ( $4.4 \times 2.8$ :  $S < 0.9$  Jy) and 1.4 GHz ( $1.1 \times 0.8$ ), plus H I, X-ray and optical data.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ :  $S = 3.0 \pm 1.3$  Jy) and 1420 MHz ( $\sim 1'$ :  $S = 2.2 \pm 0.8$  Jy),

including review of flux densities.  
 Jackson *et al.* 2008, ApJ, 674, 936. XMM and H I observations.  
 Gök *et al.* 2009, Ap&SS, 324, 17. Optical observations.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G89.0+4.7**

HB21

**RA:** 20<sup>h</sup>45<sup>m</sup>00<sup>s</sup>  
**Dec:** +50°35′

**1-GHz flux/Jy:** 220  
**Spectral index:** 0.38

**Size/arcmin:** 120×90  
**Type:** S

**Radio:** Distorted shell (4C50.52, an extragalactic double, is within the boundary of the remnant).

**Optical:** Filaments and patches.

**X-ray:** Centrally brightened.

**Distance:** Various associations imply 0.8 kpc.

**References:**

Hirabayashi & Takahashi 1972, PASJ, 24, 231. 30-m dish at 4.2 GHz (11′ :  $S=160\pm 40$  Jy).  
 Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5′ :  $S=148\pm 16$  Jy), plus optical filaments.  
 Hill 1974, MNRAS, 169, 59. Half-Mile Telescope at 1.4 GHz (3′×3′9).  
 Haslam *et al.* 1975, A&A, 39, 453. Effelsberg 100-m at 2.7 GHz (4′4).  
 Fukui & Tatematsu 1988, IAUCom, 101, 261. CO observations of the vicinity (2′7).  
 Tatematsu *et al.* 1990, A&A, 237, 189. DRAO at 408 MHz (3′5×4′5) and 1.4 GHz (1′0×1′3), including HI, plus CO observations of adjacent molecular cloud.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Leahy & Aschenbach 1996, A&A, 315, 260. ROSAT observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Koo *et al.* 2001, ApJ, 552, 175. NRAO 12-m and other CO observations (27″ and 45″) of eastern part.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′5 :  $S=228\pm 5$  Jy).  
 Uyaniker *et al.* 2003, ApJ, 585, 785. CGPS at 1.4 GHz (1′) including polarisation.

Byun *et al.* 2006, ApJ, 637, 283. CO observations of surroundings.  
 Lazendic & Slane 2006, ApJ, 647, 350. X-ray observations.  
 Leahy 2006, ApJ, 647, 1125. CGPS at 408 MHz (2′8×3′7) and 1.4 GHz (0′8×1′1).  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′ : S=259\pm 19$  Jy) and 1420 MHz ( $\sim 1′ : S=183\pm 9$  Jy), including polarisation and review of flux densities.  
 Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity HI.  
 Mavromatakis *et al.* 2007, A&A, 461, 991. Optical observations.  
 Shinn *et al.* 2009, ApJ, 693, 1883. IR observations.  
 Pannuti *et al.* 2010, AJ, 140, 1787. ASCA and Chandra observations.  
 Shinn *et al.* 2010, AdSpR, 45, 445. IR observations in S.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′5 :  $S=107\pm 11$  Jy), including polarisation and review of flux densities.  
 Reichardt *et al.* 2012, A&A, 546, A21.  $\gamma$ -ray detection.  
 Shinn *et al.* 2012, ApJ, 759, 34. AKARI observations of H<sub>2</sub>.  
 Pivato *et al.* 2013, ApJ, 779, 179. Fermi observations.

**G93.3+6.9**

DA 530, 4C(T)55.38.1

**RA:** 20<sup>h</sup>52<sup>m</sup>25<sup>s</sup>  
**Dec:** +55°21′

**1-GHz flux/Jy:** 9  
**Spectral index:** 0.45

**Size/arcmin:** 27×20  
**Type:** C?

Has been called G93.2+6.7.

**Radio:** Shell, with two bright limbs, highly polarised.

**X-ray:** Compact central source.

**Distance:** HI observations suggest 2.2 kpc.

**References:**

Roger & Costain 1976, A&A, 51, 151. DRAO at 1.42 GHz (2′×2′4 :  $S=6.9$  Jy).  
 Haslam *et al.* 1980, A&A, 92, 57. Effelsberg 100-m at 1.72 GHz (7′6 :  $S=6.47\pm 0.52$  Jy) and 2.7 GHz (4′4 :  $S=5.64\pm 0.64$  Jy), plus review of flux densities.  
 Lalitha *et al.* 1984, A&A, 131, 196. Effelsberg 100-m at 4.75 GHz (smoothed to 3′ :  $S=4.01\pm 0.57$  Jy).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Landecker *et al.* 1999, ApJ, 527, 866. DRAO at 408 MHz (3′5×4′3) and 1.4 GHz (1′0×1′2), including polarisation and HI.

Foster & Routledge 2003, ApJ, 598, 1005. HI for distance.  
 Kaplan *et al.* 2004, ApJS, 153, 269. Chandra limits for any compact source.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′ : S=10.5\pm 0.7$  Jy) and 1420 MHz, including review of flux densities.  
 Jiang *et al.* 2007, ApJ, 670, 1142. Chandra observations.  
 Bocchino *et al.* 2008, AdSpR, 41, 407. XMM observations.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.



**G93.7–0.2**

**RA:** 21<sup>h</sup>29<sup>m</sup>20<sup>s</sup>  
**Dec:** +50°50′

**1-GHz flux/Jy:** 65  
**Spectral index:** 0.65

CTB 104A, DA 551

**Size/arcmin:** 80  
**Type:** S

Has been called G93.6–0.2 and G93.7–0.3.

**Radio:** Distorted, faint shell.

**Distance:** Association with H<sub>I</sub> features suggests 1.5 kpc.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5′ : S = 18.4 \pm 1.0$  Jy).  
 Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz ( $7.6 : S = 53.5 \pm 5.0$  Jy), plus review of flux densities.  
 Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to  $2′ : S = 58 \pm 6$  Jy).  
 Mantovani *et al.* 1991, A&A, 247, 545. Effelsberg 100-m at 4.75 GHz (smoothed to  $3′ : S = 33.5 \pm 4.0$  Jy), including polarisation, plus review of flux densities.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emis-

sion.  
 Uyaniker *et al.* 2002, ApJ, 565, 1022. CGPS 1.4 GHz ( $54″ \times 49″$ ), including H<sub>I</sub>, and 408 MHz ( $3.7 \times 2.8$ ).  
 Uyaniker *et al.* 2003, ApJ, 585, 785. CGPS at 1.4 GHz ( $1′$ ) including polarisation.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′ : S = 67 \pm 6$  Jy) and 1420 MHz ( $\sim 1′ : S = 35 \pm 4$  Jy), including polarisation and review of flux densities.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz ( $9.5 : S = 25.0 \pm 2.5$  Jy), including polarisation and review of flux densities.

**G94.0+1.0**

**RA:** 21<sup>h</sup>24<sup>m</sup>50<sup>s</sup>  
**Dec:** +51°53′

**1-GHz flux/Jy:** 13  
**Spectral index:** 0.45

3C434.1

**Size/arcmin:** 30×25  
**Type:** S

**Radio:** Incomplete shell, containing H<sub>I</sub> shell.

**Distance:** Association with stellar wind bubble implies 5.2 kpc.

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $5′ : S = 6.1 \pm 0.8$  Jy), and 37-m at 1.7 GHz ( $S = 11 \pm 3$  Jy).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5′ : S = 5.8 \pm 0.4$  Jy). Also NRAO 140-ft at 5 GHz ( $6′$ ).  
 Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz ( $7.6 : S = 12.0 \pm 1.3$  Jy), plus review of flux densities.  
 Goss *et al.* 1984, A&A, 138, 469. WSRT at 610 MHz (smoothed to  $100″ : S = 16 \pm 1.7$  Jy) and Effelsberg 100-m at 4.75 GHz ( $2.4 : S = 7.2 \pm 0.5$  Jy).  
 Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to  $2′ : S = 16 \pm 3$  Jy).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Uyaniker *et al.* 2003, ApJ, 585, 785. CGPS at 1.4 GHz ( $1′$ ) including polarisation.

Foster *et al.* 2004, A&A, 417, 79. DRAO at 1.4 GHz, including H<sub>I</sub>.  
 Foster 2005, A&A, 441, 1043. CGPS at 408 MHz ( $2.8 \times 3.6$ ) and 1.4 GHz ( $0.8 \times 1.0$ ) for spectral index studies, plus other observations.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′ : S = 20 \pm 2$  Jy) and 1420 MHz ( $\sim 1′ : S = 11.3 \pm 1.0$  Jy), including review of flux densities.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5 : S = 6.2 \pm 0.4$  Jy) including polarisation and review of flux densities.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.  
 Jeong *et al.* 2013, ApJ, 770, 105. CO observations of region.

**G96.0+2.0**

**RA:** 21<sup>h</sup>30<sup>m</sup>30<sup>s</sup>  
**Dec:** +53°59′

**1-GHz flux/Jy:** 0.35  
**Spectral index:** 0.6

**Size/arcmin:** 26  
**Type:** S

**Radio:** Faint, arc in S, poorly defined in N.

**Distance:** Association for H<sub>I</sub> indicates 4 kpc.

**References:**

Kothes *et al.* 2005, A&A, 444, 871. CGPS at 408 MHz ( $2.8 \times 3.5$ ) and 1.4 GHz ( $50″ \times 61″$ ) including H<sub>I</sub>.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′ : S = 0.42 \pm 0.06$  Jy) and 1420 MHz ( $\sim 1′ : S = 0.24 \pm 0.02$  Jy),

including review of flux densities.  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5 : S = 0.14 \pm 0.02$  Jy) including polarisation and review of flux densities.

**G106.3+2.7**

**RA:** 22<sup>h</sup>27<sup>m</sup>30<sup>s</sup>  
**Dec:** +60°50′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.6

**Size/arcmin:** 60×24  
**Type:** C?

Incorporates the pulsar wind nebula G106.6+2.9 (the ‘Boomerang’).

**Radio:** Faint extended source, which brighter ‘head’ to NE.

**X-ray:** Pulsar and wind nebula.

**Point sources:** Pulsar.

**References:**

Pineault & Joncas 2000, AJ, 120, 3218. DRAO at 408 MHz (3′9×3′5 :  $S = 10.5 \pm 0.3$  Jy) and 1.4 GHz (1′2×1′0 :  $S = 4.9 \pm 0.6$  Jy), plus H<sub>I</sub>.  
 Halpern *et al.* 2001, ApJ, 547, 323. X-ray and radio observations of the ‘head’.  
 Halpern *et al.* 2001, ApJ, 552, L125. Pulsar detection.  
 Kothes *et al.* 2001, ApJ, 560, 236. CGPS at 1.4 GHz, including H<sub>I</sub>, plus CO and other observations.  
 Kothes *et al.* 2004, ApJ, 607, 855. H<sub>I</sub> polarisation absorption.  
 Ng & Romani 2004, ApJ, 601, 479. Chandra detection of pulsar wind nebula.  
 Kothes *et al.* 2006, ApJ, 638, 225. Effelsberg 100-m at 4.85 (2′4), 8.35 (1′4), 10.5 (1′2) and 32 GHz (0′45) of pulsar wind

nebula, including polarisation.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz (~3′ :  $S = 8.6 \pm 1.0$  Jy) and 1420 MHz (~1′ :  $S = 4.8 \pm 0.5$  Jy), including polarisation and review of flux densities.  
 Abdo *et al.* 2007, ApJ, 664, L91.  $\gamma$ -ray observations.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Acciari *et al.* 2009, ApJ, 703, L6.  $\gamma$ -ray observations.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′5 :  $S = 2.0 \pm 0.3$  Jy), including polarisation and review of flux densities.

**G108.2–0.6**

**RA:** 22<sup>h</sup>53<sup>m</sup>40<sup>s</sup>  
**Dec:** +58°50′

**1-GHz flux/Jy:** 8  
**Spectral index:** 0.5

**Size/arcmin:** 70×54  
**Type:** S

**Radio:** Faint shell.

**Distance:** Possible associated H<sub>I</sub> structures suggest 3.2 kpc.

**References:**

Tian *et al.* 2007, A&A, 465, 907. DRAO at 408 MHz (2′8×3′3 :  $S = 11.5 \pm 1.2$  Jy) and 1.4 GHz (1′0×1′2 :  $S = 6.6 \pm 0.7$  Jy) including H<sub>I</sub>.

**G109.1–1.0**

CTB 109

**RA:** 23<sup>h</sup>01<sup>m</sup>35<sup>s</sup>  
**Dec:** +58°53′**1-GHz flux/Jy:** 22  
**Spectral index:** 0.45**Size/arcmin:** 28  
**Type:** S**Radio:** Semicircular shell, with the Molecular cloud S152 is to the immediate W.**X-ray:** Semicircular shell, with pulsar at W edge.**Point sources:** Long period X-ray pulsar.**Distance:** Various observations imply 3.2 kpc.**References:**

- Hughes *et al.* 1981, ApJ, 246, L127. WSRT at 610 MHz ( $1' : S = 40 \pm 5$  Jy) shows bad CLEAN artefacts.
- Blair & Kirshner 1981, Nature, 291, 132. Optical spectra.
- Downes 1983, MNRAS, 203, 695. Effelsberg 100-m at 2.7 GHz ( $4.4' : S = 13.0 \pm 1.5$  Jy).
- Sofue *et al.* 1983, PASJ, 35, 447. NRO 45-m at 10.2 GHz ( $2.7'$ ).
- Hughes *et al.* 1984, ApJ, 283, 147. WSRT at 610 MHz ( $20'' : S = 26 \pm 3$  Jy) 1.4 GHz ( $10''$ ), DRAO at 1.4 GHz ( $1' \times 1.2' : S = 16.8 \pm 2$  Jy) and Algonquin 46-m at 6.5 GHz ( $4.5' : S = 6.7 \pm 1$  Jy).
- Braun & Strom 1986, A&AS, 63, 345. WSRT H $\alpha$  observations.
- Tatematsu *et al.* 1987, PASJ, 39, 755. NRO 45-m at 10 GHz ( $2.7'$ ), plus polarisation.
- Tatematsu *et al.* 1987, A&A, 184, 279. CO observations of the surroundings ( $2.7'$ ).
- Hanson *et al.* 1988, A&A, 195, 114. EXOSAT of pulsar. see also: Hanson *et al.* 1988, A&A, 207, 204. Erratum.
- Morini *et al.* 1988, ApJ, 333, 777. EXOSAT observations.
- Koyama *et al.* 1989, PASJ, 41, 461. X-ray observations of pulsar.
- Coe *et al.* 1989, MNRAS, 238, 649. IRAS observations of surroundings.
- Green 1989, MNRAS, 238, 737. OH observations.
- Tatematsu *et al.* 1990, ApJ, 351, 157. CO of surroundings, plus X-ray observations.
- Davies & Coe 1991, MNRAS, 249, 313. Optical and IR observations near pulsar.
- Hurford & Fesen 1995, MNRAS, 277, 549. ROSAT imaging.
- Rho & Petre 1997, ApJ, 484, 828. ROSAT observations.
- Parmar *et al.* 1998, A&A, 330, 175. X-ray observations.
- Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.
- Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.
- Patel *et al.* 2001, ApJ, 563, L45. Chandra observations of pulsar.
- Kothes *et al.* 2002, ApJ, 576, 169. CGPS at 1.4 GHz ( $68'' \times 59''$ ), including H $\alpha$ , plus CO observations.
- Sasaki *et al.* 2004, ApJ, 617, 322. XMM observations.
- Sasaki *et al.* 2006, ApJ, 642, L149. CO observations of surroundings, plus Chandra observations.
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 26 \pm 3$  Jy) and 1420 MHz ( $\sim 1' : S = 17.4 \pm 1.2$  Jy), including polarisation and review of flux densities.
- Tian *et al.* 2010, MNRAS, 404, L1. CGPS for H $\alpha$  absorption.
- Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9.5' : S = 9.8 \pm 0.5$  Jy) including polarisation and review of flux densities.
- Castro *et al.* 2012, ApJ, 756, 88. Fermi observations.
- Kothes & Foster 2012, ApJ, 746, L4. H $\alpha$  and CO observations of region.
- Sasaki *et al.* 2013, A&A, 552, A45. Chandra observations of NE.
- Tendulkar *et al.* 2013, ApJ, 772, 31. Pulsar proper motion study.

**G111.7–2.1**

Cassiopeia A, 3C461

**RA:** 23<sup>h</sup>23<sup>m</sup>26<sup>s</sup>**1-GHz flux/Jy:** 2720**Size/arcmin:** 5**Dec:** +58°48′**Spectral index:** 0.77**Type:** S

Presumably the remnant of a late 17th century SN.

**Radio:** Bright shell with compact knots and extended plateau of emission.**Optical:** Fast knots and quasi-stationary flocculi, with many filaments at large radii, and NE ‘jet’.**X-ray:** Incomplete shell, with hard spectral component.**Point sources:** Central compact X-ray source.**Distance:** Optical expansion, plus proper motions indicate 3.4 kpc.**References:**

- Anderson *et al.* 1991, ApJ, 373, 146. VLA at 1.4 and 5 GHz (1'') for spectral variations.
- Anderson *et al.* 1995, ApJ, 441, 300. VLA at 1.4 GHz and 4.8 GHz (both 1''), for polarisation studies.
- Anderson & Rudnick 1995, ApJ, 441, 307. VLA at 1.4 GHz and 4.8 GHz, for proper motion studies.
- Kassim *et al.* 1995, ApJ, 455, L59. VLA at 74 (25'') and 332 MHz (6''), including spectral index comparisons.
- Anderson & Rudnick 1996, ApJ, 456, 234. VLA for spectral index comparisons.
- Schwarz *et al.* 1997, A&AS, 123, 43. WSRT at 1.4 GHz (30'') for HI absorption.
- Reynoso *et al.* 1997, A&A, 317, 203. VLA at 1.4 GHz (11'' × 14'') for HI absorption.
- O'Sullivan & Green 1999, MNRAS, 303, 575. Flux density changes at 13.5, 15.5 and 16.5 GHz.
- Agüeros & Green 1999, MNRAS, 305, 957. 151 MHz observations for bulk expansion studies.
- Mason *et al.* 1999, AJ, 118, 2908. Flux density at 32 GHz ( $S = 194 \pm 5$  Jy).
- Reichart & Stephens 2000, ApJ, 537, 904. Flux density changes at 1405 MHz.
- Gothelf *et al.* 2001, ApJ, 552, L39. Chandra observations, showing outer shock.
- Bleeker *et al.* 2001, A&A, 365, L225. XMM observations.
- Maccarone *et al.* 2001, A&A, 368, 267. BeppoSAX observations.
- Douvion *et al.* 2001, A&A, 369, 589. ISO observations.
- Thorstensen *et al.* 2001, AJ, 122, 297. Optical expansion studies.
- Hwang *et al.* 2001, ApJ, 560, L175. Chandra observations of Doppler shifted lines.
- Fesen *et al.* 2001, AJ, 122, 2644. HST observations.
- Willingale *et al.* 2002, A&A, 381, 1039. XMM observations.
- Mereghetti *et al.* 2002, ApJ, 569, 275. XMM observations of central source.
- Reynoso & Goss 2002, ApJ, 575, 871. VLA at 5 GHz (6'' × 6'') for H<sub>2</sub>CO absorption studies.
- Reich 2002, in NSPS, p1. Effelsberg 100-m at 32 GHz, including polarisation.
- Rho *et al.* 2003, ApJ, 592, 299. IR observations.
- Laming & Hwang 2003, ApJ, 597, 347. Chandra spectroscopy.
- Hines *et al.* 2004, ApJS, 154, 290. Spitzer observations.
- Morse *et al.* 2004, ApJ, 614, 727. HST proper motion studies.
- Hwang *et al.* 2004, ApJ, 615, L117. Deep Chandra imaging.
- Krause *et al.* 2004, Nature, 432, 596. IR and molecular line observations of surroundings.
- Bamba *et al.* 2005, ApJ, 621, 793. Chandra observations of rim.
- Wilson & Batrla 2005, A&A, 430, 561. Observational constraints on dust.
- Krause *et al.* 2005, Science, 308, 1604. Spitzer light echoes from surroundings.
- Fesen *et al.* 2006, ApJ, 636, 848. Optical and IR limits for central sources.
- Vinyaikin 2006, ARep, 50, 143. Secular decrease at 36, 81.5 and 151.5 MHz.
- Laming *et al.* 2006, ApJ, 644, 260. Chandra observations, particularly of NE ‘jet’.
- Fesen *et al.* 2006, ApJ, 645, 283. HST observations for expansion studies.
- Renaud *et al.* 2006, ApJ, 647, L41.  $\gamma$ -ray line observations.
- Lazendic *et al.* 2006, ApJ, 651, 250. Chandra spectroscopy of bright knots.
- Ennis *et al.* 2006, ApJ, 652, 376. Spitzer observations.
- Mookerjee *et al.* 2006, MNRAS, 371, 761. Sub-mm [C I] observations.
- Kang & Koo 2007, ApJS, 173, 85. SGPS of high velocity HI.
- Patnaude & Fesen 2007, AJ, 133, 147. X-ray variability of compact features.
- Albert *et al.* 2007, A&A, 474, 937.  $\gamma$ -ray observations.
- Rho *et al.* 2008, ApJ, 673, 271. Spitzer observations.
- Uchiyama & Aharonian 2008, ApJ, 677, L105. X-ray variability of compact features.
- Rest *et al.* 2008, ApJ, 681, L81. SN light echo.
- Hammell & Fesen 2008, ApJS, 179, 195. HST of outer knots.
- Krause *et al.* 2008, Science, 320, 1195. SN light echo spectrum.
- Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.
- Helmboldt & Kassim 2009, AJ, 138, 838. Low radio frequency temporal variations.
- Maeda *et al.* 2009, PASJ, 61, 1217. Suzaku observations.
- Smith *et al.* 2009, ApJ, 693, 713. Spitzer observations.
- Patnaude & Fesen 2009, ApJ, 697, 535. X-ray proper motions.
- Pavlov & Luna 2009, ApJ, 703, 910. Chandra observations of central source.
- Barlow *et al.* 2010, A&A, 518, L138. Herschel observations.
- Abdo *et al.* 2010, ApJ, 710, L92. Fermi observations.
- Acciari *et al.* 2010, ApJ, 714, 163.  $\gamma$ -ray observations.
- Sibthorpe *et al.* 2010, ApJ, 719, 1553. AKARI and sub-mm observations of region.
- DeLaney *et al.* 2010, ApJ, 725, 2038. Spitzer and Chandra observations for 3-D structure.
- Patnaude *et al.* 2011, ApJ, 729, L28. Chandra observations of fading.
- Rest *et al.* 2011, ApJ, 732, 3. SN light echo observations.
- Fesen *et al.* 2011, ApJ, 736, 109. HST variability studies.
- Besel & Krause 2012, A&A, 541, L3. IR light echoes.
- Hwang & Laming 2012, ApJ, 746, 130. Chandra observations.
- Rho *et al.* 2012, ApJ, 747, L6. AKARI CO observations.
- Vogt *et al.* 2012, ApJ, 750, 155. Spitzer light echoes.
- Isenne *et al.* 2012, ApJ, 757, 126. Spitzer spectroscopy.
- Asgekar *et al.* 2013, A&A, 551, L11. LOFAR of carbon recombination lines.
- Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.
- Rutherford *et al.* 2013, ApJ, 769, 64. Chandra spectroscopy.
- Milisavljevic & Fesen 2013, ApJ, 772, 134. Optical spectroscopy for 3-D structure.
- Koo *et al.* 2013, Science, 342, 1346. IR spectroscopy.
- Willström *et al.* 2013, A&A, 558, L2. CO observations.

**G113.0+0.2**

**RA:** 23<sup>h</sup>36<sup>m</sup>35<sup>s</sup>  
**Dec:** +61°22′

**1-GHz flux/Jy:** 4  
**Spectral index:** 0.5?

**Size/arcmin:** 40×17?  
**Type:** ?

**Radio:** Elongated, extent not well defined.

**Point sources:** Contains old pulsar.

**Distance:** Association for H<sub>I</sub> indicates 3.1 kpc.

**References:**

Kothes *et al.* 2005, A&A, 444, 871. CGPS at 408 MHz (2′.8×3′.1) and 1.4 GHz (49′′×55′′) including H<sub>I</sub>.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz (~3′) and 1420 MHz (~1′).

Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 :  $S = 1.9 \pm 0.5$  Jy) including polarisation and review of flux densities.

**G114.3+0.3**

**RA:** 23<sup>h</sup>37<sup>m</sup>00<sup>s</sup>  
**Dec:** +61°55′

**1-GHz flux/Jy:** 5.5  
**Spectral index:** 0.5

**Size/arcmin:** 90×55  
**Type:** S

**Radio:** Shell, with H<sub>II</sub> region S165 within the boundary of the remnant.

**Optical:** Faint emission in centre and to S.

**Point sources:** Pulsar near centre of remnant.

**Distance:** Association with H<sub>I</sub> and other features implies 0.7 kpc.

**References:**

Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz (4′.4 :  $S = 3.6$  Jy) and  $S_{1.4 \text{ GHz}} = 4.4$  Jy from 1.4 GHz survey data, plus H<sub>I</sub> from Maryland–Green Bank survey.  
 Kulkarni *et al.* 1993, Nature, 362, 135. Pulsar association.  
 Fürst *et al.* 1993, A&A, 276, 470. Pulsar association.  
 Becker *et al.* 1996, A&A, 306, 464. ROSAT of pulsar.  
 Fesen *et al.* 1997, AJ, 113, 767. Optical observations.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 2.7 GHz.  
 Mavromatakis *et al.* 2002, A&A, 383, 1011. Optical observations.

Yar-Uyaniker *et al.* 2004, ApJ, 616, 247. CGPS at 1.4 GHz (49′′×55′′), including H<sub>I</sub> (1′.0×1′.1).  
 Tian & Leahy 2006, ChJAA, 6, 543. CGPS at 408 MHz (3′.4×3′.9 :  $S = 12.0 \pm 6.0$  Jy) and 1.4 GHz (1′.0×1′.1 :  $S = 9.8 \pm 0.8$  Jy).  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 1420 MHz (~1′ :  $S = 5.4 \pm 0.8$  Jy), including review of flux densities.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′.5 :  $S = 6.9 \pm 0.7$  Jy), including polarisation and review of flux densities.

**G116.5+1.1**

**RA:** 23<sup>h</sup>53<sup>m</sup>40<sup>s</sup>  
**Dec:** +63°15′

**1-GHz flux/Jy:** 10  
**Spectral index:** 0.5

**Size/arcmin:** 80×60  
**Type:** S

**Radio:** Distinct shell, with high polarisation.

**Optical:** Detected.

**Distance:** Association with H<sub>I</sub> features implies 1.6 kpc.

**References:**

Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz (4′.4 :  $S = 4.7 \pm 0.4$  Jy) and  $S_{1.4 \text{ GHz}} = 8.0 \pm 0.8$  Jy from 1.4 GHz survey data, plus H<sub>I</sub> from Maryland–Green Bank survey.  
 Fesen *et al.* 1997, AJ, 113, 767. Optical observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Yar-Uyaniker *et al.* 2004, ApJ, 616, 247. CGPS at 1.4 GHz (49′′×55′′), including H<sub>I</sub> (1′.0×1′.1).  
 Mavromatakis *et al.* 2005, A&A, 435, 141. Optical observations.

Tian & Leahy 2006, ChJAA, 6, 543. CGPS at 408 MHz (3′.4×3′.8 :  $S = 15.0 \pm 1.5$  Jy) and 1.4 GHz (1′.0×1′.1 :  $S = 10.6 \pm 0.7$  Jy).  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz (~3′ :  $S = 12.5 \pm 1.6$  Jy) and 1420 MHz (~1′ :  $S = 10.3 \pm 0.70$  Jy), including polarisation and review of flux densities.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′.5 :  $S = 5.7 \pm 0.6$  Jy), including polarisation and review of flux densities.

**G116.9+0.2**

CTB 1

**RA:** 23<sup>h</sup>59<sup>m</sup>10<sup>s</sup>  
**Dec:** +62°26′**1-GHz flux/Jy:** 8  
**Spectral index:** 0.57**Size/arcmin:** 34  
**Type:** S

Has been called G117.3+0.1 and G116.9+0.1.

**Radio:** Incomplete shell.**Optical:** Filaments on sky survey.**X-ray:** Centrally brightened, with NE ‘breakout’.**Point sources:** Pulsar to NE.**Distance:** Association with H<sub>I</sub> features implies 1.6 kpc.**References:**

- Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S' : S = 3.9 \pm 1.0$  Jy), and 37-m at 1.7 GHz ( $S = 5.5 \pm 2.0$  Jy), plus review of flux densities.
- van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.
- Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $S' : S = 4.2 \pm 0.2$  Jy).
- Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $6'8 : S = 3.0 \pm 0.3$  Jy).
- Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz ( $56'' \times 64''$ ) and 1.4 GHz ( $22'' \times 25''$ ).
- Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz ( $4'4 : S = 4.8 \pm 0.4$  Jy) and  $S_{1.4 \text{ GHz}} = 7.8 \pm 0.8$  Jy from 1.4 GHz survey data, plus H<sub>I</sub> from Maryland–Green Bank survey.
- Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
- Landecker *et al.* 1982, AJ, 87, 1379. DRAO at 1.42 GHz and H<sub>I</sub> ( $2' \times 2'3 : S = 8.3 \pm 0.5$  Jy), plus review of flux densities. see also: Landecker *et al.* 1983, AJ, 88, 877. Erratum.
- Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
- Hailey & Craig 1994, ApJ, 434, 635. Optical spectroscopy.
- Hailey & Craig 1995, ApJ, 455, L151. ROSAT of nearby pulsar.
- Fesen *et al.* 1997, AJ, 113, 767. Optical observations.
- Craig *et al.* 1997, ApJ, 488, 307. ROSAT observations.
- Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.
- Reich 2002, in NSPS, p1. Effelsberg 100-m at 10.6 GHz ( $69''$ ), including polarisation.
- Yar-Uyaniker *et al.* 2004, ApJ, 616, 247. CGPS at 1.4 GHz ( $49'' \times 55''$ ), including H<sub>I</sub> ( $1'0 \times 1'1$ ).
- Lazendic & Slane 2006, ApJ, 647, 350. X-ray observations.
- Tian & Leahy 2006, ChJAA, 6, 543. CGPS at 408 MHz ( $3'4 \times 3'8 : S = 15.0 \pm 1.5$  Jy) and 1.4 GHz ( $1'0 \times 1'1 : S = 8.1 \pm 0.4$  Jy).
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 10.5 \pm 0.8$  Jy) and 1420 MHz ( $\sim 1' : S = 7.0 \pm 0.8$  Jy), including review of flux densities.
- Pannuti *et al.* 2010, AJ, 140, 1787. ASCA and Chandra observations.
- Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9'5 : S = 3.6 \pm 0.4$  Jy) including polarisation and review of flux densities.

**G119.5+10.2**

CTA 1

**RA:** 00<sup>h</sup>06<sup>m</sup>40<sup>s</sup>  
**Dec:** +72°45′**1-GHz flux/Jy:** 36  
**Spectral index:** 0.6**Size/arcmin:** 90′  
**Type:** S

Has been called G119.5+10.3.

**Radio:** Incomplete shell, with ‘breakout’ to NW.**Optical:** Faint diffuse nebulosities.**X-ray:** Centrally brightened.**Point sources:** Central pulsar.**Distance:** Associated H I shell indicates 1.4 kpc.**References:**

- Sieber *et al.* 1979, A&A, 74, 361. Effelsberg 100-m at 2.7 GHz (4′4″:  $S=23.6\pm 2.8$  Jy).
- Sieber *et al.* 1981, A&A, 103, 393. Effelsberg 100-m at 2.7 GHz and 1.7 GHz (7′6″:  $S=31.6\pm 2.5$  Jy), and 151 MHz (4′:  $S=62.6\pm 6$  Jy).
- Fesen *et al.* 1981, ApJ, 247, 148. Optical, including spectra.
- Fesen *et al.* 1983, ApJS, 51, 337. Deep [O III] imagery.
- Seward 1990, ApJS, 73, 781. Einstein observations.
- Simonetti 1992, ApJ, 386, 170. VLA observations of background sources for rotation measure studies.
- Pineault *et al.* 1993, AJ, 105, 1060. DRAO at 1.4 GHz (1′:  $S=34\pm 4$  Jy), plus H I and IRAS.
- Seward *et al.* 1995, ApJ, 453, 284. ROSAT observations.
- Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.
- Slane *et al.* 1997, ApJ, 485, 221. ASCA and ROSAT observations.
- Pineault *et al.* 1997, A&A, 324, 1152. DRAO at 408 MHz (3′5″ and 1.4 GHz (1′0″)).
- Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.
- Brazier *et al.* 1998, MNRAS, 295, 819. Studies of central, compact  $\gamma$ -ray source.
- Mavromatakis *et al.* 2000, A&A, 353, 371. Optical imagery.
- Roberts *et al.* 2001, ApJS, 133, 451. ASCA observations.
- Reich 2002, in NSPS, p1. Effelsberg 100-m at 1.4 GHz (9′4″).
- Slane *et al.* 2004, ApJ, 601, 1045. XMM observations of central source.
- Halpern *et al.* 2004, ApJ, 612, 398. Chandra observations of central nebula, plus optical and radio limits for compact source.
- Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.
- Abdo *et al.* 2008, Science, 322, 1218. Fermi detection of pulsar.
- Lin *et al.* 2010, ApJ, 725, L1. XMM observations of pulsar.
- Caraveo *et al.* 2010, ApJ, 725, L6. XMM observations of pulsar.
- Sun *et al.* 2011, A&A, 535, A64. Urumqi 25-m at 4.8 GHz (9′5″:  $S=11.6\pm 1.2$  Jy) and Effelsberg 100-m at 2.6 GHz (4′4″:  $S=20.3\pm 2.0$  Jy) including polarisation.
- Lin *et al.* 2012, MNRAS, 426, 2283. Suzaku observations.
- Mignani *et al.* 2013, MNRAS, 430, 1354. Optical limits for pulsar.
- Aliu *et al.* 2013, ApJ, 764, 38.  $\gamma$ -ray observations.

**G120.1+1.4**

Tycho, 3C10, SN1572

**RA:** 00<sup>h</sup>25<sup>m</sup>18<sup>s</sup>**1-GHz flux/Jy:** 56**Size/arcmin:** 8**Dec:** +64°09′**Spectral index:** 0.58**Type:** S

This is the remnant of the Tycho's SN of AD1572.

**Radio:** Shell, brightest to the NE.

**Optical:** Faint filaments/knots to the NNW, NE and E.

**X-ray:** Shell, brighter to the NE.

**Point sources:** Faint radio source near centre of the remnant, thought to be extragalactic.

**Distance:** HI observations suggest 2.3–3 kpc, optical proper motion and shock velocity gives 2.4 kpc.

**References:**

- Duin & Strom 1975, A&A, 39, 33. WSRT at 610 MHz (57''×64'') and 5 GHz (7''×8'').
- Klein *et al.* 1979, A&A, 76, 120. Effelsberg 100-m at 10.7 GHz (1'2'':S=13.1±0.8 Jy), plus review of flux densities.
- Strom *et al.* 1982, MNRAS, 200, 473. WSRT at 1415 MHz (27''×31'') from 1971 and 1979, for expansion.
- Dickel *et al.* 1982, ApJ, 257, 145. Comparison of radio, X-ray and optical observations.
- Reid *et al.* 1982, ApJ, 261, 485. Einstein observations.
- Seward *et al.* 1983, ApJ, 266, 287. Einstein observations.
- Tan & Gull 1985, MNRAS, 216, 949. Radio at 2.7 GHz (4'' from 1980 and 1983, and One-Mile Telescope at 1.4 GHz (23'') from 1965 and 1980, for expansion.
- Albinson *et al.* 1986, MNRAS, 219, 427. HI observations.
- Green & Gull 1987, MNRAS, 224, 1055. VLA HI absorption observations towards central radio source.
- Smith *et al.* 1988, ApJ, 325, 288. EXOSAT spectrum and image (smoothed to 13'').
- Dickel *et al.* 1991, AJ, 101, 2151. VLA at 1.4 and 5 GHz (1'5').
- Wood *et al.* 1992, AJ, 103, 1338. VLA at 5 GHz (1'5) polarisation studies.
- Fink *et al.* 1994, A&A, 283, 635. X-ray spectra.
- Vancura *et al.* 1995, ApJ, 441, 680. X-ray spectra and ROSAT image.
- Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.
- Schwarz *et al.* 1995, A&A, 299, 193. WSRT and Effelsberg 100-m at 1.4 GHz (50''), and VLA at 1.4 GHz (13''), for neutral hydrogen studies.
- Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.
- Hwang & Gotthelf 1997, ApJ, 475, 665. ASCA observations.
- Reynoso *et al.* 1997, ApJ, 491, 816. VLA at 1.4 GHz (1'4×1'5) from 1984 and 1994 for expansion studies.
- Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.
- Reynoso *et al.* 1999, AJ, 117, 1827. VLA at 1.4 GHz (13''), for HI studies.
- Katz-Stone *et al.* 2000, ApJ, 529, 453. VLA at 333 MHz and 1.4 GHz (9'5×7'7), for spectral index studies.
- Ghavamian *et al.* 2000, ApJ, 535, 266. Optical observations of shock precursors.
- Hughes 2000, ApJ, 545, L53. ROSAT X-ray expansion.
- Decourchelle *et al.* 2001, A&A, 365, L218. XMM observations.
- Ghavamian *et al.* 2001, ApJ, 547, 995. Optical spectroscopy.
- Douvion *et al.* 2001, A&A, 373, 281. ISO observations.
- Aharonian *et al.* 2001, A&A, 373, 292. Upper limit on high energy  $\gamma$ -rays.
- Hwang *et al.* 2002, ApJ, 581, 1101. Chandra observations.
- Lee *et al.* 2004, ApJ, 605, L113. Observations of molecular clouds in vicinity.
- Bamba *et al.* 2005, ApJ, 621, 793. Chandra observations of rim.
- Warren *et al.* 2005, ApJ, 634, 376. Chandra observations.
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$ : S=86±5 Jy) and 1420 MHz ( $\sim 1'$ : S=40.5±1.5 Jy), including polarisation and review of flux densities.
- Lee *et al.* 2007, ApJ, 659, L133. H $\alpha$  observations.
- Cassam-Chenaï *et al.* 2007, ApJ, 665, 315. Chandra observations.
- Rest *et al.* 2008, ApJ, 681, L81. SN light echo.
- Krause *et al.* 2008, Nature, 456, 617. SN light echo spectrum.
- Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.
- Tamagawa *et al.* 2009, PASJ, 61, S167. Suzaku observations.
- Furuzawa *et al.* 2009, ApJ, 693, L61. Suzaku observations.
- Lee *et al.* 2010, ApJ, 715, L146. H $\alpha$  observations.
- Katsuda *et al.* 2010, ApJ, 709, 1387. Chandra proper motions study.
- Raymond *et al.* 2010, ApJ, 712, 901. H $\alpha$  spectroscopy.
- Hayat *et al.* 2010, ApJ, 725, 894. Suzaku observations of expansion.
- Ishihara *et al.* 2010, A&A, 521, L61. AKARI observations.
- Tian & Leahy 2011, ApJ, 729, L15. HI and CO observations.
- Acciari *et al.* 2011, ApJ, 730, L20.  $\gamma$ -ray observations.
- Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9'5'': S = 20.0±2.0 Jy) including polarisation and review of flux densities.
- Giordano *et al.* 2012, ApJ, 744, L2. Fermi observations.
- Gomez *et al.* 2012, MNRAS, 420, 3557. Herschel IR dust observations.
- Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.
- Williams *et al.* 2013, ApJ, 770, 129. Spitzer observations.



**G126.2+1.6**

**RA:** 01<sup>h</sup>22<sup>m</sup>00<sup>s</sup>  
**Dec:** +64°15′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.5

**Size/arcmin:** 70  
**Type:** S?

**Radio:** Poorly defined shell.

**Optical:** Filaments, mostly in W.

**References:**

Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ :  $S=6.8\pm0.7$  Jy) and 2.7 GHz (4′4 :  $S=3.9\pm0.4$  Jy).  
 Blair *et al.* 1980, ApJ, 242, 592. Optical detection and spectra.  
 Rosado 1982, RMxAA, 5, 127. Optical spectra.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz (4′4) and 4.8 GHz (2′6).  
 Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz (3′5×3′9 :  $S=12\pm2.5$  Jy) and part at 1.4 GHz (1′1×1′0), plus review of flux densities.  
 Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at

863 MHz (14′5 :  $S=6.1\pm1.6$  Jy).  
 Boumis *et al.* 2005, A&A, 443, 175. Optical observations.  
 Tian & Leahy 2006, A&A, 447, 205. CGPS at 408 MHz (3′4×3′8 :  $S=9.7\pm3.9$  Jy) and 1.4 GHz (1′0×1′1 :  $S=6.7\pm2.1$  Jy), plus other observations for spectral index studies.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′$  :  $S=5.7\pm0.7$  Jy) and 1420 MHz ( $\sim 1′$  :  $S=6.4\pm1.1$  Jy), including review of flux densities.  
 Sun *et al.* 2007, A&A, 463, 993. Urumqi 25-m at 5 GHz (9′5 :  $S=2.6\pm0.6$  Jy), including polarisation.  
 see also: Sun *et al.* 2007, A&A, 469, 1003. Erratum.

**G127.1+0.5**

**RA:** 01<sup>h</sup>28<sup>m</sup>20<sup>s</sup>  
**Dec:** +63°10′

**1-GHz flux/Jy:** 12  
**Spectral index:** 0.45

**Size/arcmin:** 45  
**Type:** S

R5

Has been called G127.3+0.7.

**Radio:** Distinct shell, with bright central source.

**Optical:** Detected.

**Point sources:** Flat radio spectrum (extragalactic) source at centre of remnant.

**Distance:** 1.2–1.3 kpc if associated with NGC 559.

**References:**

Caswell 1977, MNRAS, 181, 789. Half-Mile Telescope at 1.42 GHz (3′5×3′9), plus other observations of central source.  
 Pauls 1977, A&A, 59, L13. Effelsberg 100-m at 1.4 GHz (9′ :  $S=8\pm1$  Jy).  
 Salter *et al.* 1978, A&A, 66, 77. Effelsberg 100-m at 2.7 GHz (4′4), plus 5 and 8.7 GHz of the central source.  
 Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ :  $S=10.8\pm1.3$  Jy).  
 Pauls *et al.* 1982, A&A, 112, 120. WSRT at 610 MHz (56″×62″) and HI absorption to the point source with the VLA.  
 Geldzahler & Shaffer 1982, ApJ, 260, L69. Observations of central source.  
 Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz (4′4) and 4.8 GHz (2′6).  
 Goss & van Gorkom 1984, JApA, 5, 425. WSRT HI absorption of central source.  
 Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz

(3′5×3′9 :  $S=17.9\pm2.0$  Jy) and 1.4 GHz (1′13×1′0 :  $S=10.1\pm0.8$  Jy), plus review of flux densities.  
 Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′5 :  $S=14.6\pm0.8$  Jy).  
 Kaplan *et al.* 2004, ApJS, 153, 269. Chandra limits for any compact sources.  
 Leahy & Tian 2006, A&A, 451, 251. CGPS at 408 MHz (3′4×3′8 :  $S=17.1\pm1.7$  Jy) and 1.4 GHz (1′0×1′2 :  $S=10.0\pm0.8$  Jy).  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3′$  :  $S=15.9\pm1.0$  Jy) and 1420 MHz ( $\sim 1′$  :  $S=9.7\pm0.6$  Jy), including polarisation and review of flux densities.  
 Sun *et al.* 2007, A&A, 463, 993. Urumqi 25-m at 5 GHz (9′5 :  $S=6.3\pm0.7$  Jy), including polarisation.  
 see also: Sun *et al.* 2007, A&A, 469, 1003. Erratum.

**G130.7+3.1**

**RA:** 02<sup>h</sup>05<sup>m</sup>41<sup>s</sup>  
**Dec:** +64°49′

**1-GHz flux/Jy:** 33  
**Spectral index:** 0.07

3C58, SN1181

**Size/arcmin:** 9×5  
**Type:** F

This is the remnant of the SN of AD1181.

**Radio:** Filled-centre, highly polarised, with high frequency turnover.

**Optical:** Faint filaments.

**X-ray:** Centrally brightened, with faint jet.

**Point sources:** Central pulsar.

**Distance:** H I absorption indicates 2 kpc.

**References:**

- Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58'' : S = 26.7 \pm 0.5$  Jy).
- Wilson & Weiler 1976, A&A, 49, 357. WSRT at 610 MHz ( $58'' \times 64''$ ), 1.4 GHz ( $24'' \times 27''$ ) and 5 GHz ( $7'' \times 8''$ ).
- van den Bergh 1978, ApJ, 220, L9. Optical observations.
- Becker *et al.* 1982, ApJ, 255, 557. X-ray observations.
- Green & Gull 1982, Nature, 299, 606. H I absorption distance.
- Fesen 1983, ApJ, 270, L53. Optical spectra.
- Reynolds & Aller 1985, AJ, 90, 2312. VLA at 1.4 GHz ( $2''$ ), for limits of shell.
- Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT spectrum.
- Green 1986, MNRAS, 218, 533. 151 MHz observations ( $1'2 \times 1'3 : S = 36 \pm 4$  Jy), plus 2.7 GHz ( $4''$ ), plus Einstein observations for limit on shell.
- Green 1987, MNRAS, 225, 11P. Flux density increase at 408 MHz.
- Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz ( $26''5 : S = 24.2 \pm 1.4$  Jy).
- Reynolds & Aller 1988, ApJ, 327, 845. VLA at 1.4 ( $2''4$ ) and 4.9 GHz ( $2''5$ ).
- Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz ( $90'' : S = 15.0 \pm 2.0$  Jy), plus review of flux densities.
- Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.
- Green & Scheuer 1992, MNRAS, 258, 833. IRAS upper limits.
- Roberts *et al.* 1993, A&A, 274, 427. H I absorption.
- Wallace *et al.* 1994, A&A, 286, 565. H I of surroundings.
- Helfand *et al.* 1995, ApJ, 453, 741. ROSAT observations.
- Torii *et al.* 2000, PASJ, 52, 875. ASCA observations.
- Bietenholz *et al.* 2001, ApJ, 560, 772. VLA at 74 MHz ( $26'' : S = 33.6$  Jy) and 327 MHz ( $8''2 : S = 33.9$  Jy), for spectral index and expansion studies.
- Bocchino *et al.* 2001, A&A, 369, 1078. XMM observations.
- Murray *et al.* 2002, ApJ, 568, 226. Chandra pulsar detection.
- Camilo *et al.* 2002, ApJ, 571, L41. Pulsar detection in radio.
- Reich 2002, in NSPS, p1. Effelsberg 100-m at 32 GHz ( $26''$ ) for polarised intensity.
- Slane *et al.* 2002, ApJ, 571, L45. Chandra observations.
- Slane *et al.* 2004, ApJ, 616, 403. Deep Chandra imaging.
- Bietenholz 2006, ApJ, 645, 1180. VLA at 1.4 GHz ( $1''36$ ) for expansion studies.
- Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 32.2 \pm 2.0$  Jy) and 1420 MHz ( $\sim 1' : S = 31.9 \pm 1.0$  Jy), including polarisation and review of flux densities.
- Gotthelf *et al.* 2007, ApJ, 654, 267. XMM observations.
- Slane *et al.* 2008, ApJ, 676, L33. Spitzer and other IR observations.
- Fesen *et al.* 2008, ApJS, 174, 379. Optical observations for proper motion studies.
- Shearer & Neustroev 2008, MNRAS, 390, 235. Optical observations of pulsar nebula.
- Shibanov *et al.* 2008, A&A, 486, 273. Optical observations of pulsar nebula.
- Abdo *et al.* 2009, ApJ, 699, L102. Fermi observations of pulsar.
- Livingstone *et al.* 2009, ApJ, 706, 1163. Pulsar observations.
- Hurley-Walker *et al.* 2009, MNRAS, 396, 365. Radio observations at 14 to 18 GHz.
- Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz ( $9'5 : S = 31.7 \pm 3.0$  Jy) including polarisation and review of flux densities.
- Bietenholz *et al.* 2013, MNRAS, 431, 2590. Proper motion study of pulsar.
- Kothes *et al.* 2013, A&A, 560, A18. CGPS H I observations for distance.

**G132.7+1.3**

HB3

**RA:** 02<sup>h</sup>17<sup>m</sup>40<sup>s</sup>  
**Dec:** +62°45′**1-GHz flux/Jy:** 45  
**Spectral index:** 0.6**Size/arcmin:** 80  
**Type:** S

Has been called G132.4+2.2.

**Radio:** Faint shell, adjacent to W3/4/5 complex.**Optical:** Complete, filamentary shell, shock excited spectra.**X-ray:** Partial shell.**Point sources:** Pulsar nearby.**Distance:** Interaction with surroundings suggests 2.2 kpc.**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S=33.8 \pm 7.0$  Jy).  
 d'Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.  
 Read 1981, MNRAS, 194, 863. Radio at 151 MHz (4.4) and 1.4 GHz (2') showing H $\alpha$  shell.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Fesen & Gull 1983, PASP, 95, 196. Optical image.  
 Leahy *et al.* 1985, ApJ, 294, 183. Einstein observations.  
 Landecker *et al.* 1987, AJ, 94, 111. DRAO at 408 MHz ( $3.5 \times 4' : S=75 \pm 15$  Jy), plus review of flux densities.  
 Routledge *et al.* 1991, A&A, 247, 529. DRAO at 1.4 GHz (1.0 $\times$ 1.1) for H $\alpha$ , plus CO observations.  
 Fesen *et al.* 1995, AJ, 110, 2876. Optical imaging and spectroscopy, DRAO at 408 MHz ( $3.5 \times 4'$ ) and 1.4 GHz (1.0 $\times$ 1.1).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA detection of compact

OH emission.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14.5 :  $S=51.5 \pm 3.5$  Jy).  
 Tian & Leahy 2005, A&A, 436, 187. CGPS at 408 MHz ( $3.4 \times 3.8'$ ) and 1.4 GHz (1.0 $\times$ 1.1), for spectral index studies.  
 see also: Tian & Leahy 2006, A&A, 451, 991. Erratum.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S=61 \pm 9$  Jy) and 1420 MHz ( $\sim 1' : S=29.4 \pm 2.7$  Jy), including review of flux densities.  
 Lazendic & Slane 2006, ApJ, 647, 350. X-ray observations.  
 Green 2007, BASI, 35, 77. Review of radio spectrum.  
 Shi *et al.* 2008, A&A, 487, 601. Urumqi 25-m at 4.8 GHz (9.5), plus other survey observations for spectral studies.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.

**G152.4–2.1****RA:** 04<sup>h</sup>07<sup>m</sup>50<sup>s</sup>  
**Dec:** +49°11′**1-GHz flux/Jy:** 3.5?  
**Spectral index:** 0.7?**Size/arcmin:** 100 $\times$ 95  
**Type:** S**Radio:** Bilateral shell.**References:**

Foster *et al.* 2013, A&A, 549, A107. Effelsberg 100-m at 2.7 GHz, including polarisation, plus various radio survey observations.

**G156.2+5.7****RA:** 04<sup>h</sup>58<sup>m</sup>40<sup>s</sup>  
**Dec:** +51°50′**1-GHz flux/Jy:** 5  
**Spectral index:** 0.5**Size/arcmin:** 110  
**Type:** S**Radio:** Faint shell, brighter in E and W.**Optical:** Filamentary ring and smaller patchy ring.**X-ray:** Faint shell.**References:**

Pfeffermann *et al.* 1991, A&A, 246, L28. ROSAT detection.  
 Reich *et al.* 1992, A&A, 256, 214. Effelsberg 100-m at 1.4 (9' :  $S=4.2 \pm 1.0$  Jy) and 2.7 GHz (4.3 :  $S=3.0 \pm 1.0$  Jy), plus H $\alpha$  and IRAS.  
 Yamauchi *et al.* 1993, PASJ, 45, 795. Hard X-ray observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Yamauchi *et al.* 1999, PASJ, 51, 13. ASCA observations of some regions.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 2.7 GHz, including polarisation.  
 Pannuti & Allen 2004, AdSpR, 33, 434. ASCA and RXTE observations.

Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S=8.1 \pm 1.3$  Jy), including review of flux densities.  
 Xu *et al.* 2007, A&A, 470, 969. Urumqi 25-m at 4.8 GHz (9.5 :  $S=2.5 \pm 0.5$  Jy), including polarisation.  
 Gerardy & Fesen 2007, MNRAS, 376, 929. Optical observations.  
 Katsuda *et al.* 2009, PASJ, 61, S155. Suzaku observations.  
 Uchida *et al.* 2012, PASJ, 64, 61. Suzaku observations.

**G159.6+7.3**

**RA:** 05<sup>h</sup>20<sup>m</sup>00<sup>s</sup>  
**Dec:** +50°00′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 240×180?  
**Type:** S

**Optical:** Large, faint shell.

**X-ray:** Possible emission.

**References:**

Fesen & Milisavljevic 2010, AJ, 140, 1163. H $\alpha$  and other observations.

**G160.9+2.6**

**RA:** 05<sup>h</sup>01<sup>m</sup>00<sup>s</sup>  
**Dec:** +46°40′

**1-GHz flux/Jy:** 110  
**Spectral index:** 0.64

**Size/arcmin:** 140×120  
**Type:** S

HB9

Has been called G160.5+2.8 and G160.4+2.8.

**Radio:** Large, filamentary shell.

**Optical:** Incomplete shell.

**X-ray:** Centrally brightened.

**Point sources:** Pulsar within boundary of the remnant, plus several nearby compact radio sources.

**Distance:** Various observations suggests less than 4 kpc.

**References:**

d’Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.  
 Damashek *et al.* 1978, ApJ, 225, L31. Pulsar.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Dwarakanath *et al.* 1982, JApA, 3, 207. Radio observations at 34.5 MHz (26′×40′ :  $S = 750 \pm 150$  Jy), plus review of flux densities.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT H $\alpha$  absorption to nearby point source.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Leahy 1987, ApJ, 322, 917. Einstein observations.  
 Leahy & Roger 1991, AJ, 101, 1033. DRAO at 408 MHz (3′5″×4′8″) and 1.4 GHz (1′0″×1′4″), including H $\alpha$  and discussion of distance.  
 Yamauchi & Koyama 1993, PASJ, 45, 545. Hard X-ray observations.  
 Leahy & Aschenbach 1995, A&A, 293, 853. ROSAT observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Leahy *et al.* 1998, A&A, 339, 601. 232 MHz (3′8″×5′2″),

151 MHz (4′2″×5′8″) and Effelsberg 100-m at 4.7 GHz (2′5″) for spectral index studies.  
 Roger *et al.* 1999, A&AS, 137, 7. 22 MHz flux density ( $S = 1130 \pm 340$  Jy).  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′5″ :  $S = 91 \pm 3$  Jy).  
 Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3'$  :  $S = 102 \pm 7$  Jy) and 1420 MHz ( $\sim 1'$  :  $S = 54.0 \pm 2.9$  Jy), including polarisation and review of flux densities.  
 Leahy & Tian 2007, A&A, 461, 1013. CGPS at 408 MHz (2′8″×3′9″ :  $S = 117.8 \pm 5.3$  Jy) and 1.4 GHz (58″×80″ :  $S = 65.9 \pm 3.4$  Jy).  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′5″ :  $S = 34 \pm 3$  Jy), including polarisation and review of flux densities.  
 Gosachinskii 2013, AstL, 39, 179. H $\alpha$  observations of region.

**G166.0+4.3**

**RA:** 05<sup>h</sup>26<sup>m</sup>30<sup>s</sup>  
**Dec:** +42°56′

**1-GHz flux/Jy:** 7  
**Spectral index:** 0.37

VRO 42.05.01

**Size/arcmin:** 55×35  
**Type:** S

**Radio:** Two arcs of strikingly different radii.

**Optical:** Nearly complete ring.

**X-ray:** Predominantly in SW.

**Distance:** H<sub>I</sub> indicates 4.5 kpc.

**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.  
 Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S' : S = 5.2 \pm 1.0$  Jy).  
 Lozinskaya 1979, AuJPh, 32, 113. H $\alpha$  interferometry.  
 Landecker *et al.* 1982, ApJ, 261, L41. DRAO at 1.4 GHz ( $1'.0 \times 1'.4$ ), plus review of flux densities.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Pineault *et al.* 1985, A&A, 151, 52. VLA at 1.4 GHz ( $16'' \times 20''$ ) of part of remnant, and optical observations.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Braun & Strom 1986, A&AS, 63, 345. WSRT H $\alpha$  Observations.  
 Pineault *et al.* 1987, ApJ, 315, 580. DRAO and VLA combined at 1.4 GHz ( $20''$ ).  
 Landecker *et al.* 1989, MNRAS, 237, 277. DRAO at 1.4 GHz ( $1'.0 \times 1'.4$ ), including H $\alpha$ .  
 Burrows & Guo 1994, ApJ, 421, L19. ROSAT images and spec-

tra.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Guo & Burrows 1997, ApJ, 480, L51. ASCA observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Leahy & Tian 2005, A&A, 440, 929. CGPS at 408 MHz ( $3'.4 \times 5'.0$ ) and 1.4 GHz ( $1'.0 \times 1'.4$ ), for spectral index studies. see also: Tian & Leahy 2006, A&A, 451, 991. Erratum.  
 Kothes *et al.* 2006, A&A, 457, 1081. CGPS at 408 MHz ( $\sim 3' : S = 8.1 \pm 0.9$  Jy) and 1420 MHz ( $\sim 1' : S = 5.1 \pm 0.4$  Jy), including polarisation and review of flux densities.  
 Bocchino *et al.* 2009, A&A, 498, 139. XMM observations.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz ( $9'.5 : S = 3.3 \pm 0.3$  Jy), including polarisation and review of flux densities.  
 Araya *et al.* 2013, MNRAS, 434, 2202. Fermi observations.

**G178.2–4.2**

**RA:** 05<sup>h</sup>35<sup>m</sup>05<sup>s</sup>  
**Dec:** +28°11′

**1-GHz flux/Jy:** 2  
**Spectral index:** 0.5

**Size/arcmin:** 72×62  
**Type:** S

**Radio:** Faint shell, brighter in NE.

**References:**

Gao *et al.* 2011, A&A, 532, A144. Urumqi 25-m at 5 GHz ( $9'.5 : S = 1.0 \pm 0.1$  Jy), plus other observations.

**G179.0+2.6**

**RA:** 05<sup>h</sup>53<sup>m</sup>40<sup>s</sup>  
**Dec:** +31°05′

**1-GHz flux/Jy:** 7  
**Spectral index:** 0.4

**Size/arcmin:** 70  
**Type:** S?

**Radio:** Thick shell, with background extragalactic sources near centre.

**References:**

Fürst & Reich 1986, A&A, 154, 303. Effelsberg 100-m at 1.4 ( $9'.4$ ), 2.7 ( $4'.3$ ) and 4.75 GHz ( $2'.4$ ).  
 Fürst *et al.* 1989, A&A, 223, 66. Observations of central, extragalactic source.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 2.7 GHz.

Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz ( $9'.5 : S = 3.2 \pm 0.3$  Jy), including polarisation and review of flux densities.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G180.0–1.7**

S147

**RA:** 05<sup>h</sup>39<sup>m</sup>00<sup>s</sup>  
**Dec:** +27°50′

**1-GHz flux/Jy:** 65  
**Spectral index:** varies

**Size/arcmin:** 180  
**Type:** S

**Radio:** Large faint shell, with spectral break.

**Optical:** Wispy ring.

**X-ray:** Possible detection.

**Point sources:** Pulsar within boundary, with faint wind nebula.

**Distance:** Optical absorption towards stars indicates  $> 0.36$  and  $< 0.88$  kpc.

**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.  
 Sofue *et al.* 1980, PASJ, 32, 1. Effelsberg 100-m at 5 GHz (2′.6 of parts).  
 Kundu *et al.* 1980, A&A, 92, 225. Effelsberg 100-m at 2.7 GHz (5′.5 :  $S = 34.9 \pm 4$  Jy) and 1.6 GHz (10′ :  $S = 60.2 \pm 6$  Jy).  
 Angerhofer & Kundu 1981, AJ, 86, 1003. Arecibo at 430 MHz (9′ :  $S = 97 \pm 20$  Jy).  
 Fürst *et al.* 1982, A&A, 115, 428. Observations of compact radio sources near the remnant.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Fürst & Reich 1986, A&A, 163, 185. Effelsberg 100-m at 1.4, 2.7 and 4.7/5.0 GHz (9′.4, 4′.3 and 2′.4/2′.6).  
 Sauvageot *et al.* 1990, A&A, 227, 183. EXOSAT possible detection.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Anderson *et al.* 1996, ApJ, 468, L55. Pulsar detection.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 2.7 GHz.

Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′.5 :  $S = 77 \pm 10$  Jy).  
 Romani & Ng 2003, ApJ, 585, L41. Chandra of pulsar.  
 Kramer *et al.* 2003, ApJ, 593, L31. Pulsar observations.  
 Sallmen & Welsh 2004, A&A, 426, 555. Optical absorption towards background stars.  
 Drew *et al.* 2005, MNRAS, 362, 753. H $\alpha$  imaging.  
 Ng *et al.* 2007, ApJ, 654, 487. Pulsar and wind nebula observations.  
 Xiao *et al.* 2008, A&A, 482, 783. Urumqi 25-m at 4.8 GHz (9′.5 :  $S = 15.4 \pm 3.0$  Jy) and Effelsberg 100-m at 2.6 GHz (4′.4 :  $S = 34.6 \pm 4.0$  Jy).  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.  
 Katsuta *et al.* 2012, ApJ, 752, 135. Fermi observations.

**G182.4+4.3**

**RA:** 06<sup>h</sup>08<sup>m</sup>10<sup>s</sup>  
**Dec:** +29°00′

**1-GHz flux/Jy:** 0.5  
**Spectral index:** 0.4

**Size/arcmin:** 50  
**Type:** S

**Radio:** Incomplete shell.

**Optical:** Brighter in S and NW.

**X-ray:** Diffuse emission.

**References:**

Kothes *et al.* 1998, A&A, 331, 661. Effelsberg 100-m at 1.4, 2.7, 4.9 and 10.5 GHz (9′.4 :  $S = 0.36 \pm 0.08$  Jy, 4′.4 :  $S = 0.25 \pm 0.04$  Jy, 2′.5 :  $S = 0.20 \pm 0.02$  Jy and 1′.2 :  $S = 0.15 \pm 0.03$  Jy), plus X-ray upper limit.  
 Reich 2002, in NSPS, p1. Effelsberg 100-m at 2.7 GHz and 4.9 GHz (3′).  
 Sun *et al.* 2011, A&A, 536, A83. Urumqi 25-m at 5 GHz (9′.5 :

$S = 0.26 \pm 0.5$  Jy) including polarisation and review of flux densities.  
 Sezer *et al.* 2012, MNRAS, 427, 1168. Optical and XMM observations.  
 Jeong *et al.* 2012, Ap&SS, 342, 389. CO observations of region.

**G184.6–5.8**

Crab Nebula, 3C144, SN1054

**RA:** 05<sup>h</sup>34<sup>m</sup>31<sup>s</sup>  
**Dec:** +22°01′**1-GHz flux/Jy:** 1040  
**Spectral index:** 0.30**Size/arcmin:** 7×5  
**Type:** F

This is the remnant of the SN of AD1054.

**Radio:** Filled-centre, central pulsar, with faint ‘jet’ (or tube) extending from the N edge.

**Optical:** Strongly polarised filaments, diffuse synchrotron emission, with ‘jet’ faintly visible.

**X-ray:** Central ‘torus’ around the pulsar.

**Point sources:** Pulsar powering the remnant.

**Distance:** Proper motions and radial velocities give 2 kpc.

**References:**

- Velusamy 1984, *Nature*, 308, 251. VLA at 1.4 GHz, radio detection of ‘jet’.
- Velusamy 1985, *MNRAS*, 212, 359. VLA at 1.4 GHz (15’’).
- Aller & Reynolds 1985, *ApJ*, 293, L73. Flux density decrease.
- Fesen & Gull 1986, *ApJ*, 306, 259. Deep [OIII] imagery of ‘jet’.
- Marcelin *et al.* 1990, *A&A*, 228, 471. Optical of ‘jet’.
- Hester *et al.* 1990, *ApJ*, 357, 539. Optical and IR images.
- Hickson & van den Bergh 1990, *ApJ*, 365, 224. Optical polarisation.
- Bietenholz & Kronberg 1990, *ApJ*, 357, L13. VLA at 1.4 GHz (1’’8).
- Bietenholz & Kronberg 1992, *ApJ*, 393, 206. VLA at 1.5 and 5 GHz (1’’8) and 1.5 and 14 GHz (6’’5) for spectral studies.
- Fesen & Staker 1993, *MNRAS*, 263, 69. [OIII] imaging of ‘jet’ and proper motion studies.
- Kassim *et al.* 1993, *AJ*, 106, 2218. VLA at 74 MHz (20’’).
- Véron-Cetty & Woltjer 1993, *A&A*, 270, 370. Continuum and [OIII] photometry.
- Wallace *et al.* 1994, *A&A*, 286, 565. HI of surroundings.
- Frail *et al.* 1995, *ApJ*, 454, L129. VLA at 333 MHz (20’’) for limits on shell.
- Bietenholz *et al.* 1997, *ApJ*, 490, 291. Comparison of VLA observations at 74 MHz, 327 MHz, 1.5 GHz and 5 GHz for spectral index studies.
- Blair *et al.* 1997, *ApJS*, 109, 473. HST imaging.
- Fesen *et al.* 1997, *AJ*, 113, 354. Limits on H $\alpha$  halo.
- van der Meulen *et al.* 1998, *A&A*, 330, 321.  $\gamma$ -ray observations.
- Tanimori *et al.* 1998, *ApJ*, 492, L33.  $\gamma$ -ray observations.
- Nugent 1998, *PASP*, 110, 831. Optical expansion.
- Sankrit *et al.* 1998, *ApJ*, 504, 344. HST images.
- Wallace *et al.* 1999, *ApJS*, 124, 181. DRAO at 1.4 GHz (1’0×2’8), plus Effelsberg 100-m, for HI studies.
- Greiveldinger & Aschenbach 1999, *ApJ*, 510, 305. X-ray variability of torus.
- Weisskopf *et al.* 2000, *ApJ*, 536, L81. Chandra observations.
- Sollerman *et al.* 2000, *ApJ*, 537, 861. HST observations.
- Aharonian *et al.* 2000, *ApJ*, 539, 317.  $\gamma$ -ray observations.
- Oser *et al.* 2001, *ApJ*, 547, 949.  $\gamma$ -ray observations.
- Willingale *et al.* 2001, *A&A*, 365, L212. XMM observations.
- Douvion *et al.* 2001, *A&A*, 373, 281. ISO observations.
- Bietenholz *et al.* 2001, *ApJ*, 560, 254. Multi-epoch VLA observations, showing variations near the pulsar.
- Bandiera *et al.* 2002, *A&A*, 386, 1044. 1.3 mm observations.
- Hester *et al.* 2002, *ApJ*, 577, L49. HST and Chandra multi-epoch observations.
- Atkins *et al.* 2003, *ApJ*, 595, 803.  $\gamma$ -ray observations.
- Green *et al.* 2004, *MNRAS*, 355, 1315. Sub-mm and ISO observations.
- Mori *et al.* 2004, *ApJ*, 609, 186. Chandra observations.
- Čadež *et al.* 2004, *ApJ*, 609, 797. Optical observations.
- Aharonian *et al.* 2004, *ApJ*, 614, 897.  $\gamma$ -ray observations.
- Bietenholz *et al.* 2004, *ApJ*, 615, 794. VLA at 5 GHz (1’’4) and HST multi-epoch observation for proper motion studies.
- Melatos *et al.* 2005, *ApJ*, 633, 931. Multi-epoch near-IR observations central region.
- Seward *et al.* 2006, *ApJ*, 636, 873. Chandra observations of scattering halo.
- Temim *et al.* 2006, *AJ*, 132, 1610. Spitzer observations. see also: Temim *et al.* 2009, *AJ*, 137, 5155. Erratum.
- Aharonian *et al.* 2006, *A&A*, 457, 899.  $\gamma$ -ray observations.
- Seward *et al.* 2006, *ApJ*, 652, 1277. Chandra observations.
- MacAlpine *et al.* 2007, *AJ*, 133, 81. Optical spectroscopy.
- Kaplan *et al.* 2008, *ApJ*, 677, 1201. HST proper motion of pulsar.
- Rudie *et al.* 2008, *MNRAS*, 384, 1200. [OIII] observations of ‘jet’, for proper motion.
- Hurley-Walker *et al.* 2009, *MNRAS*, 396, 365. Radio observations at 14 to 18 GHz.
- Tziamtzis *et al.* 2009, *A&A*, 497, 167. Limits on H $\alpha$  halo.
- Carlebois *et al.* 2010, *AJ*, 139, 2083. Optical imaging spectroscopy.
- Aumont *et al.* 2010, *A&A*, 514, A70. IRAM 30-m at 150 GHz (16’’7:  $S=244\pm 24$  Jy) and GBT at 90 GHz (9’’3).
- Loh *et al.* 2012, *MNRAS*, 421, 789. IR observations of H<sub>2</sub>.
- Lundqvist & Tziamtzis 2012, *MNRAS*, 423, 1571. Optical limits on outer shell.
- Temim *et al.* 2012, *ApJ*, 753, 72. Spitzer observations of dust.
- Gomez *et al.* 2012, *ApJ*, 760, 96. Herschel IR and sub-mm observations of dust.
- Löll *et al.* 2013, *ApJ*, 765, 152. HST optical line and continuum observations.
- Barlow *et al.* 2013, *Science*, 342, 1343. Herschel far-IR spectroscopy.

**G189.1+3.0**

**RA:** 06<sup>h</sup>17<sup>m</sup>00<sup>s</sup>  
**Dec:** +22°34′

**1-GHz flux/Jy:** 160  
**Spectral index:** 0.36

IC443, 3C157

**Size/arcmin:** 45  
**Type:** C

**Radio:** Limb-brightened to NE, with faint extension to the E.

**Optical:** Brightest to the NE, with faint filaments outside the NE boundary.

**X-ray:** Shell, brightest to the NE, plus compact source with nebula.

**Point sources:** X-ray source and nebula in S.

**Distance:** Mean optical velocity suggests 0.7–1.5 kpc, association with S249 gives 1.5–2 kpc.

**References:**

- Fesen 1984, ApJ, 281, 658. Optical of filament to far NE.  
 Erickson & Mahoney 1985, ApJ, 290, 596. TPT at 4 frequencies between 31 and 74 MHz (13′×11′ to 5′4×4′7), plus review of flux densities.  
 Braun & Strom 1986, A&A, 164, 193. WSRT at 327 MHz (72″×185″) and 1.4 GHz (17″×43″), plus HI and IRAS.  
 Green 1986, MNRAS, 221, 473. 151 MHz observations (1′2×3′1) and Half-Mile Telescope at 1.4 GHz (2′1×5′4).  
 Mufson *et al.* 1986, AJ, 92, 1349. Radio, IR, optical, UV and X-ray comparison, including VLA at 1.6 GHz (3″8×3″3 and 40″).  
 Petre *et al.* 1988, ApJ, 335, 215. Einstein and other X-ray observations.  
 Dickel *et al.* 1989, AJ, 98, 1363. VLA at 1.4 GHz (1″1×1″2) of NE.  
 Burton *et al.* 1990, ApJ, 355, 197. IR observations of shocked O<sub>2</sub>.  
 Wood *et al.* 1991, AJ, 102, 224. VLA at 5 GHz (3″6×3″8) of northeast, including polarisation.  
 Wang & Scoville 1992, ApJ, 386, 158. Observations of shocked molecular species.  
 Turner *et al.* 1992, ApJ, 399, 114. Observations of shocked molecular species.  
 Dickman *et al.* 1992, ApJ, 400, 203. Observations of shocked molecular species.  
 van Dishoeck *et al.* 1993, A&A, 279, 541. Observations of shocked molecular species.  
 Asaoka & Aschenbach 1994, A&A, 284, 573. X-ray, including possible overlapping remnant.  
 Tauber *et al.* 1994, ApJ, 421, 570. Observations of shocked molecular species.  
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.  
 Claussen *et al.* 1997, ApJ, 489, 143. VLA of associated OH masers.  
 Seta *et al.* 1998, ApJ, 505, 286. CO observations of surroundings.  
 Claussen *et al.* 1999, ApJ, 522, 349. High resolution observations of OH masers.  
 Oliva *et al.* 1999, A&A, 341, L75. ISO observations.  
 Cesarsky *et al.* 1999, A&A, 348, 945. ISO observations of shocked molecular H<sub>2</sub>.  
 Bocchino & Bykov 2000, A&A, 362, L29. BeppoSAX observations.  
 Rho *et al.* 2001, ApJ, 547, 885. ISO and 2Mass IR spectroscopy and imaging.  
 Olbert *et al.* 2001, ApJ, 554, L205. Chandra of compact X-ray source and surrounding nebula.  
 Bocchino & Bykov 2001, A&A, 376, 248. XMM of compact X-ray source and surrounding nebula.  
 Bocchino & Bykov 2003, A&A, 400, 203. XMM observations of compact sources.  
 Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at 863 MHz (14′5 : S = 160±5 Jy).  
 Welsh & Sallmen 2003, A&A, 408, 545. Optical absorption studies.  
 Leahy 2004, AJ, 127, 2277. DRAO at 408 MHz (3′3×8′6) and 1.4 GHz (1′0×2′6), for spectral index studies.  
 see also: Leahy 2004, AJ, 128, 1478. Addendum.  
 Snell *et al.* 2005, ApJ, 620, 758. Molecular line and IR observations of shocked material.  
 Bykov *et al.* 2005, ApJ, 624, L41. Chandra observations of compact source.  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Gaensler *et al.* 2006, ApJ, 648, 1037. Chandra of X-ray source and nebula.  
 Hewitt *et al.* 2006, ApJ, 652, 1288. GBT at 1.6 and 1.7 GHz (7′2) for OH, and VLA at 330 MHz (74″×64″).  
 Neufeld *et al.* 2007, ApJ, 664, 890. Spitzer observations.  
 Rosado *et al.* 2007, AJ, 133, 89. Observations of shocked H<sub>2</sub>.  
 Albert *et al.* 2007, ApJ, 664, L87.  $\gamma$ -ray observations.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Lee *et al.* 2008, AJ, 135, 796. VLA at 1.4 GHz (39″×42″) including HI.  
 Troja *et al.* 2008, A&A, 485, 777. XMM observations.  
 Bocchino *et al.* 2008, AdSpR, 41, 396. Integral observations.  
 Bykov *et al.* 2008, ApJ, 676, 1050. XMM, Chandra and Spitzer observations.  
 Bocchino *et al.* 2009, A&A, 498, 139. XMM observations.  
 Hirschauer *et al.* 2009, ApJ, 696, 1533. Optical absorption spectroscopy.  
 Acciari *et al.* 2009, ApJ, 698, L133.  $\gamma$ -ray observations.  
 Yamaguchi *et al.* 2009, ApJ, 705, L6. Suzaku observations.  
 Koo *et al.* 2010, AJ, 140, 262. HI Zeeman splitting observations.  
 Tavani *et al.* 2010, ApJ, 710, L151.  $\gamma$ -ray observations.  
 Yuan & Neufeld 2011, ApJ, 726, 76. Spitzer observations.  
 Xu *et al.* 2011, ApJ, 727, 81. CO observations of region.  
 Shinn *et al.* 2011, ApJ, 732, 124. AKARI observations of H<sub>2</sub>.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz (9′5 : S = 85±9 Jy), including polarisation and review of flux densities.  
 Lee *et al.* 2012, ApJ, 749, 34. CO and HCO<sup>+</sup> of region.  
 Taylor *et al.* 2012, ApJ, 750, L15. Optical absorption of background stars.  
 Yuan *et al.* 2012, ApJ, 753, 126. Spitzer spectroscopy.  
 Shinn *et al.* 2012, ApJ, 759, 34. AKARI observations of H<sub>2</sub>.  
 Satterfield *et al.* 2012, AJ, 144, 27. Optical spectroscopy.  
 Ackermann *et al.* 2013, Science, 339, 807. Fermi observations.  
 Hezareh *et al.* 2013, A&A, 558, A45. CO observations, including polarisation, of region.  
 Kokasho *et al.* 2013, ApJ, 768, L8. IR observations of [FeII], plus AKARI and Spitzer observations.



**G190.9–2.2**

**RA:** 06<sup>h</sup>01<sup>m</sup>55<sup>s</sup>  
**Dec:** +18°24′

**1-GHz flux/Jy:** 1.3?  
**Spectral index:** 0.7?

**Size/arcmin:** 70×60  
**Type:** S

**Radio:** Incomplete shell.

**References:**

Foster *et al.* 2013, A&A, 549, A107. Various radio survey observations.

**G192.8–1.1**

**RA:** 06<sup>h</sup>09<sup>m</sup>20<sup>s</sup>  
**Dec:** +17°20′

**1-GHz flux/Jy:** 20?  
**Spectral index:** 0.6?

PKS 0607+17

**Size/arcmin:** 78  
**Type:** S

Has been called G193.3–1.5. Has been regarded as part of the Origem Loop, a supposed larger remnant.

**Radio:** In complex region.

**Optical:** Encompasses S261 and S254–258.

**References:**

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (9′ :  $S=13\pm 15\%$  Jy).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 318 MHz (15′ :  $S=74\pm 32$  Jy), and  $S_{610\text{ MHz}}=40$  Jy.

Caswell 1985, AJ, 90, 1076. DRAO at 1.4 GHz (1′×3′3 :  $S=18\pm 3$  Jy).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Welsh *et al.* 2001, A&A, 372, 516. Far-UV spectroscopy.

**G205.5+0.5**

**RA:** 06<sup>h</sup>39<sup>m</sup>00<sup>s</sup>  
**Dec:** +06°30′

**1-GHz flux/Jy:** 140  
**Spectral index:** 0.4

Monoceros Nebula

**Size/arcmin:** 220  
**Type:** S

**Radio:** In complex region, parts may be HII regions.

**Optical:** Large ring, near Rosette nebula.

**X-ray:** Possibly detected.

**Distance:** Mean optical velocity suggests 0.8 kpc, low frequency radio absorption suggests 1.6 kpc.

**References:**

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (9′).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′), part only.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 111 MHz (1′ :  $S=462\pm 180$  Jy) and  $S_{610\text{ MHz}}=245$  Jy.  
 Davies *et al.* 1978, A&AS, 31, 271. Deep optical plates.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Graham *et al.* 1982, A&A, 109, 145. Effelsberg 100-m at 2.7 GHz (4.4′ :  $S=97.6\pm 12.5$  Jy), plus review of flux densities.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Leahy *et al.* 1986, MNRAS, 220, 501. Einstein observations.  
 Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz (24′, 19′ and 16′).

Esposito *et al.* 1996, ApJ, 461, 820. Possible associated  $\gamma$ -ray emission.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Oliver *et al.* 1996, A&A, 315, 578. CO observations of some of surroundings.  
 Jaffe *et al.* 1997, ApJ, 484, L129.  $\gamma$ -ray detection.  
 Aharonian *et al.* 2004, A&A, 417, 973.  $\gamma$ -ray limits.  
 Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.  
 Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Xiao & Zhu 2012, A&A, 545, A86. Review of radio, HI and H $\alpha$  observations.

**G206.9+2.3**

**RA:** 06<sup>h</sup>48<sup>m</sup>40<sup>s</sup>  
**Dec:** +06°26′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.5

PKS 0646+06

**Size/arcmin:** 60×40  
**Type:** S?

**Radio:** Diffuse source near the Monoceros Nebula.

**Optical:** Filaments detected.

**X-ray:** Possibly detected.

**References:**

Davies & Meaburn 1978, A&A, 69, 443. Optical observations.  
 Nousek *et al.* 1981, ApJ, 248, 152. HEAO-1 X-ray limit.  
 Graham *et al.* 1982, A&A, 109, 145. Effelsberg 100-m at  
 2.7 GHz (4′.4:  $S=4.1\pm 0.6$  Jy), plus review of flux densities.  
 Rosado 1982, RMxAA, 5, 127. Optical observations.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Leahy 1986, A&A, 156, 191. Einstein observations.

Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz  
 (24′, 19′ and 16′).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gao *et al.* 2011, A&A, 529, A159. Urumqi 25-m at 5 GHz  
 (9′.5:  $S=2.9\pm 0.3$  Jy), including polarisation and review of  
 flux densities.

**G213.0–0.6**

**RA:** 06<sup>h</sup>50<sup>m</sup>50<sup>s</sup>  
**Dec:** –00°30′

**1-GHz flux/Jy:** 21  
**Spectral index:** 0.4

**Size/arcmin:** 160×140?  
**Type:** S

Has also been called G213.3–0.4.

**Radio:** Large, faint shell.

**Optical:** Filamentary shell.

**Point sources:** Central X-ray source

**References:**

Reich *et al.* 2003, A&A, 408, 961. Effelsberg 100-m at  
 863 MHz (14′.5:  $S=22.0\pm 3.7$  Jy).  
 Stupar & Parker 2012, MNRAS, 419, 1413. H $\alpha$ , radio survey  
 and other observations.

**G260.4–3.4**

**RA:** 08<sup>h</sup>22<sup>m</sup>10<sup>s</sup>  
**Dec:** –43°00′

**1-GHz flux/Jy:** 130  
**Spectral index:** 0.5

Puppis A, MSH 08–44

**Size/arcmin:** 60×50  
**Type:** S

This remnant overlaps the Vela SNR (G263.9–3.3).

**Radio:** Angular shell, brightest to the E, poorly defined to the W.

**Optical:** Nebulosity and wisps.

**X-ray:** Brightest to the E.

**Point sources:** Central possible pulsating X-ray source.

**Distance:** Association with H<sub>I</sub> gives 2.2 kpc.

**References:**

Green 1971, AuJPh, 24, 773. Molonglo at 408 MHz (3′ :  $S = 198 \pm 20$  Jy).  
 Goudis & Meaburn 1978, A&A, 62, 283. H $\alpha$ +[N $\text{II}$ ] optical image.  
 Petre *et al.* 1982, ApJ, 258, 22. Einstein observations.  
 Milne *et al.* 1983, MNRAS, 204, 237. FIRST at 1415 MHz (50′), large scale emission missing.  
 Teske & Petre 1987, ApJ, 318, 370. Coronal optical line emission.  
 Dubner & Arnal 1988, A&AS, 75, 363. H<sub>I</sub> and CO observations of surroundings.  
 Arendt *et al.* 1990, ApJ, 350, 266. MOST at 843 MHz (44′×65′), with large scale emission added, plus IR, optical and X-ray observations.  
 Dubner *et al.* 1991, AJ, 101, 1466. VLA at 327 MHz (43′×73′) and 1.5 GHz (43′×77′).  
 Arendt *et al.* 1991, ApJ, 368, 474. IR observations.  
 Milne *et al.* 1993, MNRAS, 261, 366. Parkes 64-m at 4.75 (4′5 :  $S = 59 \pm 5$  Jy) and 8.4 GHz (3′ :  $S = 38 \pm 4$  Jy), plus polarisation.  
 Berthiaume *et al.* 1994, ApJ, 425, 132. X-ray spectroscopy.  
 Sutherland & Dopita 1995, ApJ, 439, 365. Spectrophotometry.  
 Reynoso *et al.* 1995, AJ, 110, 318. VLA at 1.4 GHz (90′) including neutral hydrogen.  
 Blair *et al.* 1995, ApJ, 454, L35. Far UV spectroscopy.  
 Petre *et al.* 1996, ApJ, 465, L43. ROSAT of central source.  
 Bock *et al.* 1998, AJ, 116, 1886. MOST at 843 MHz (43′×60′).  
 Pavlov *et al.* 1999, ApJ, 511, L45. Possible pulsation detection from central X-ray source.  
 Zavlin *et al.* 1999, ApJ, 525, 959. X-ray observations of central source.  
 Bocchino *et al.* 2000, A&A, 359, 316. Optical studies of selected filaments in N.

Woermann *et al.* 2000, MNRAS, 317, 421. OH observations.  
 Gaensler *et al.* 2000, ApJ, 537, L35. Radio limit for nebula around possible pulsar.  
 Reynoso *et al.* 2003, MNRAS, 345, 671. ATCA at 1.4 GHz (90′) for H<sub>I</sub> near central X-ray source.  
 Hwang *et al.* 2005, ApJ, 635, 355. Chandra observations of E edge.  
 Hui & Becker 2006, A&A, 454, 543. XMM and Chandra observations.  
 Hui & Becker 2006, A&A, 457, L33. Chandra proper motion study of central source.  
 Castelletti *et al.* 2006, A&A, 459, 535. VLA at 1.4 GHz (16′×34′ :  $S = 114 \pm 8$  Jy) and 327 MHz (45′×90′ :  $S = 263 \pm 20$  Jy).  
 Winkler & Petre 2007, ApJ, 670, 635. Chandra proper motion study of central source.  
 Paron *et al.* 2008, A&A, 480, 439. CO observations of E.  
 Hwang *et al.* 2008, ApJ, 676, 378. Suzaku observations.  
 Katsuda *et al.* 2008, ApJ, 678, 297. XMM observations.  
 Mignani *et al.* 2009, A&A, 500, 1211. Optical limits for compact X-ray source.  
 Katsuda *et al.* 2010, ApJ, 714, 1725. Chandra and XMM observations.  
 Arendt *et al.* 2010, ApJ, 725, 585. Spitzer observations.  
 Becker *et al.* 2012, ApJ, 755, 141. Chandra proper motion study of central X-ray source.  
 Katsuda *et al.* 2012, ApJ, 756, 49. XMM spectroscopy.  
 Hewitt *et al.* 2012, ApJ, 759, 89. Fermi and WMAP 23 to 90 GHz observations.  
 Dubner *et al.* 2013, A&A, 555, A9. XMM and Chandra observations.  
 Katsuda *et al.* 2013, ApJ, 768, 182. XMM observations.

**G261.9+5.5**

**RA:** 09<sup>h</sup>04<sup>m</sup>20<sup>s</sup>  
**Dec:** –38°42′

**1-GHz flux/Jy:** 10?  
**Spectral index:** 0.4?

**Size/arcmin:** 40×30  
**Type:** S

**Radio:** Faint shell with little limb brightening.

**References:**

Hill 1967, AuJPh, 20, 297. Parkes 64-m at 2650 MHz (7′5 :  $S = 7$  Jy) also  $S_{1410}$  MHz = 8 Jy,  $S_{81.5}$  MHz = 25 Jy.  
 Colomb & Dubner 1980, A&A, 82, 244. Argentine 30-m dish at 1.4 GHz, for H<sub>I</sub> possibly associated with remnant.

Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44′×71′).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G263.9–3.3**

**RA:** 08<sup>h</sup>34<sup>m</sup>00<sup>s</sup>  
**Dec:** –45°50′

**1-GHz flux/Jy:** 1750  
**Spectral index:** varies

Vela (XYZ)

**Size/arcmin:** 255  
**Type:** C

This refers to the whole Vela XYZ complex, of which X has at times been classified as a separate (filled-centre) remnant. This remnant is overlapped by G260.4–3.4 and G266.2–1.2.

**Radio:** Large shell, with flatter spectrum component (Vela X), and pulsar nebula.

**Optical:** Filaments.

**X-ray:** Patchy shell, with extensions, central nebula and pulsar.

**Point sources:** Pulsar within Vela X, with one-sided ‘jet’.

**Distance:** Vela pulsar parallax gives 0.3 kpc, optical spectra and H $\alpha$  studies suggest 0.25 kpc.

**References:**

- Milne 1968, AuJPh, 21, 201. Parkes 64-m at various frequencies, including 408 MHz (48′ :  $S = 2300 \pm 300$  Jy), 635 MHz (31′ :  $S = 2360 \pm 300$  Jy), 1410 MHz (14′ :  $S = 1640 \pm 300$  Jy) and 2650 MHz (7.5′ :  $S = 1400 \pm 250$  Jy), plus discussion of the distance.
- Milne 1980, A&A, 81, 293. Maps of Vela X with Parkes 64-m at 1.66, 2.7 and 5 GHz (12′, 8.4 and 4.4).
- Weiler & Panagia 1980, A&A, 90, 269. Clarification of notation of this region and review previous observations.
- Bignami & Caraveo 1988, ApJ, 325, L5. Pulsar proper motion from optical observations.
- Dwarakanath 1991, JApA, 12, 199. Gauribidanur ‘T’ array at 34.5 MHz (26′ × 84′ :  $S = 1800$  Jy for Vela X and  $S = 3900$  Jy for Vela YZ), plus review of flux densities.
- Bietenholz *et al.* 1991, ApJ, 376, L41. VLA at 5 GHz in vicinity of pulsar.
- Willmore *et al.* 1992, MNRAS, 254, 139. Hard X-ray observations.
- Dubner *et al.* 1992, A&AS, 96, 505. Argentine 30-m at 1.4 GHz (30′) of surrounding H $\alpha$ .
- Strom *et al.* 1995, Nature, 373, 590. Radio of X-ray extensions.
- Markwardt & Ögelman 1995, Nature, 375, 40. X-ray jet from pulsar.
- Jenkins & Wallerstein 1995, ApJ, 440, 227. Optical absorption of associated neutral carbon cloud.
- Milne 1995, MNRAS, 277, 1435. Parkes 64-m at 8.4 GHz (3′), including polarisation, of Vela X.
- Danks & Sembach 1995, AJ, 109, 2627. Optical spectroscopy of background stars.
- Blair *et al.* 1995, AJ, 110, 312. UV spectroscopy.
- Duncan *et al.* 1996, MNRAS, 280, 252. Parkes 64-m at 2.4 GHz (8.9′).
- Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″) of part.
- Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.
- Frail *et al.* 1997, ApJ, 475, 224. VLA at 330 MHz (1′ × 1.8′) and comparison with ROSAT observations of Vela X.
- Markwardt & Ögelman 1997, ApJ, 480, L13. ASCA observations of pulsar ‘jet’.
- Raymond *et al.* 1997, ApJ, 482, 881. UV spectroscopy.
- Yoshikoshi *et al.* 1997, ApJ, 487, L65.  $\gamma$ -ray observations of pulsar.
- Jenkins *et al.* 1998, ApJ, 492, L147. UV absorption to background star.
- Dubner *et al.* 1998, AJ, 116, 813. Parkes 64-m at 1.4 GHz (15′) for H $\alpha$  studies.
- Bock *et al.* 1998, AJ, 116, 1886. MOST at 843 MHz (43″ × 60″).
- Cha *et al.* 1999, ApJ, 515, L25. Optical spectra, for distance.
- Lu & Aschenbach 2000, A&A, 362, 1083. ROSAT spatially resolved spectroscopy.
- Chadwick *et al.* 2000, ApJ, 537, 414. Limit on high energy  $\gamma$ -rays from pulsar.
- Sankrit *et al.* 2001, ApJ, 549, 416. Far-UV observations of selected region.
- Pavlov *et al.* 2001, ApJ, 554, L189. Chandra two epoch observations of pulsar nebula.
- Helfand *et al.* 2001, ApJ, 556, 380. Chandra observations of pulsar and its nebula.
- Miyata *et al.* 2001, ApJ, 559, L45. Chandra of X-ray extension.
- Alvarez *et al.* 2001, A&A, 372, 636. Radio spectral index studies.  
*see also:* Alvarez *et al.* 2001, A&A, 379, 323. Erratum.
- Caraveo *et al.* 2001, ApJ, 561, 930. HST parallax observations of pulsar.
- Moriguchi *et al.* 2001, PASJ, 53, 1025. CO observations.
- Dodson *et al.* 2003, MNRAS, 343, 116. ATCA at 1.4, 2.4, 5.2 and 8.5 GHz (6.2″ × 8.1″, 26″ × 36″, 12.1″ × 10.5″ and 11.2″ × 10.6″) of pulsar nebula.
- Sankrit *et al.* 2003, ApJ, 589, 242. Optical nebulosity to NE of G266.2–1.2.
- Nichols & Slavin 2004, ApJ, 610, 285. UV absorption toward background sources.
- Hales *et al.* 2004, ApJ, 613, 977. Vela X at 31 GHz (4.1′).
- Mongano *et al.* 2005, A&A, 436, 917. XMM and other X-ray observations of pulsar nebula.
- Miceli *et al.* 2005, A&A, 442, 513. XMM observations of N rim.
- Katsuda & Tsunemi 2005, PASJ, 57, 621. XMM observations of E.
- Aharonian *et al.* 2006, A&A, 448, L43.  $\gamma$ -ray observations.
- McConnell *et al.* 2006, AJ, 131, 648. ATCA at 4.9 GHz (12′) including polarisation.
- Katsuda & Tsunemi 2006, ApJ, 642, 917. XMM observations of NE.
- Nishikida *et al.* 2006, ApJ, 644, L171. Far UV observations.
- Miceli *et al.* 2008, ApJ, 676, 1064. XMM observations.
- LaMassa *et al.* 2008, ApJ, 689, L121. XMM observations of Vela X.
- Grondin *et al.* 2013, ApJ, 774, 110. Fermi observations of Vela X.

**G266.2–1.2**

**RA:** 08<sup>h</sup>52<sup>m</sup>00<sup>s</sup>  
**Dec:** –46°20′

**1-GHz flux/Jy:** 50?  
**Spectral index:** 0.3?

**RX J0852.0–4622**  
**Size/arcmin:** 120  
**Type:** S

This remnant overlaps the Vela SNR (G263.9–3.3).

**Radio:** Incomplete shell, confused by the Vela SNR.

**Optical:** Nebulosity offset to NE.

**X-ray:** Non-thermal shell, confused by the Vela SNR, with central source, and possible associated pulsar.

**Point sources:** Central X-ray source, with optical nebula, and possible associated pulsar.

**Distance:** X-ray data suggest an upper limit of 1 kpc.

**References:**

Aschenbach 1998, *Nature*, 396, 141. ROSAT identification.  
 Iyudin *et al.* 1998, *Nature*, 396, 142.  $\gamma$ -ray observations.  
 Combi *et al.* 1999, *ApJ*, 519, L177. Radio observations.  
 Duncan & Green 2000, *A&A*, 364, 732. Parkes 64-m at 1.4 GHz (14'0), and comparison with other observations.  
 Redman *et al.* 2000, *ApJ*, 543, L153. Optical of nearly nebulosity.  
 Tsunemi *et al.* 2000, *PASJ*, 52, 887. ASCA spectral observations.  
 Slane *et al.* 2001, *ApJ*, 548, 814. ASCA observations.  
 Mereghetti *et al.* 2001, *ApJ*, 548, L213. BeppoSAX observations of central sources.  
 Pavlov *et al.* 2001, *ApJ*, 559, L131. Chandra of central X-ray source.  
 Moriguchi *et al.* 2001, *PASJ*, 53, 1025. CO observations.  
 Pellizzoni *et al.* 2002, *A&A*, 393, L65. Optical observations of central source.  
 Redman *et al.* 2002, *MNRAS*, 336, 1093. Optical nebulosity to NE.

Kargaltsev *et al.* 2002, *ApJ*, 580, 1060. Chandra observations of central source.  
 Sankrit *et al.* 2003, *ApJ*, 589, 242. Optical nebulosity to NE.  
 Redman & Meaburn 2005, *MNRAS*, 356, 969. Possible pulsar association.  
 Iyudin *et al.* 2005, *A&A*, 429, 225. XMM observations.  
 Aharonian *et al.* 2005, *A&A*, 437, L7.  $\gamma$ -ray observations.  
 Katagiri *et al.* 2005, *ApJ*, 619, L163.  $\gamma$ -ray observations.  
 Bamba *et al.* 2005, *ApJ*, 632, 294. Chandra of NW rim.  
 Reynoso *et al.* 2006, *A&A*, 449, 243. ATCA at 1.38 GHz (32'' $\times$ 37'').  
 Enomoto *et al.* 2006, *ApJ*, 652, 1268.  $\gamma$ -ray observations.  
 Mignani *et al.* 2007, *A&A*, 473, 883. Deep optical observations of compact X-ray source.  
 Aharonian *et al.* 2007, *ApJ*, 661, 236.  $\gamma$ -ray observations.  
 Katsuda *et al.* 2008, *ApJ*, 678, L35. XMM proper motion study.

**G272.2–3.2**

**RA:** 09<sup>h</sup>06<sup>m</sup>50<sup>s</sup>  
**Dec:** –52°07′

**1-GHz flux/Jy:** 0.4  
**Spectral index:** 0.6

**Size/arcmin:** 15?  
**Type:** S?

**Radio:** Diffuse shell.

**Optical:** Detected.

**X-ray:** Centrally brightened.

**References:**

Greiner *et al.* 1994, *A&A*, 286, L35. ROSAT observations, plus optical observations.  
 Duncan *et al.* 1997, *MNRAS*, 289, 97. Parkes 64-m at 1.4 GHz (18' :  $S = 0.38 \pm 0.09$  Jy) 2.4 GHz (10'6 :  $S = 0.25 \pm 0.04$  Jy) and 4.8 GHz (5'7 :  $S = 0.17 \pm 0.02$  Jy), MOST at 843 MHz

(45'' $\times$ 70'' :  $S = 0.45 \pm 0.10$  Jy), and ATCA at 2.4 GHz (37'' $\times$ 52''), plus ROSAT observations.  
 Harus *et al.* 2001, *ApJ*, 552, 614. ASCA and ROSAT observations, plus review of earlier observations.

**G279.0+1.1**

**RA:** 09<sup>h</sup>57<sup>m</sup>40<sup>s</sup>  
**Dec:** –53°15′

**1-GHz flux/Jy:** 30?  
**Spectral index:** 0.6?

**Size/arcmin:** 95  
**Type:** S

**Radio:** Faint, incomplete shell.

**Optical:** Detected.

**Point sources:** Pulsar nearby.

**References:**

Woermann & Jonas 1988, *MNRAS*, 234, 971. Hartesbeesthoek 26-m at 1.6 (30' :  $S = 25.2 \pm 4$  Jy) and 2.3 GHz (20' :  $S = 20.7 \pm 3$  Jy).  
 Duncan *et al.* 1995, *MNRAS*, 277, 319. Parkes 64-m at 1.4 (18' :  $S = 28 \pm 3$  Jy) and 2.4 GHz (11' :  $S = 20 \pm 2$  Jy), including polarisation.

Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43'' $\times$ 53'') of part.  
 Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.  
 Stupar & Parker 2011, *MNRAS*, 414, 2282. H $\alpha$  observations.

**G284.3–1.8**

**RA:** 10<sup>h</sup>18<sup>m</sup>15<sup>s</sup>  
**Dec:** –59°00′

**1-GHz flux/Jy:** 11?  
**Spectral index:** 0.3?

MSH 10–53

**Size/arcmin:** 24?  
**Type:** S

Has been called G284.2–1.8.

**Radio:** Incomplete, poorly defined shell.

**Point sources:** Pulsar with wind nebula nearby.

**References:**

Ruiz & May 1986, ApJ, 309, 667. CO and optical observations.  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz  
 (43′×50′) and Parkes 64-m at 8.4 GHz (3′ : S = 5.4±0.8 Jy)  
 including polarisation, plus earlier flux densities.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH  
 observations.

Camilo *et al.* 2001, ApJ, 557, L51. Observations of nearby pul-  
 sar.  
 Camilo *et al.* 2004, ApJ, 616, 1118. Chandra observations of  
 pulsar and nebula.  
 Abramowski *et al.* 2012, A&A, 541, A5.  $\gamma$ -ray observations.

**G286.5–1.2**

**RA:** 10<sup>h</sup>35<sup>m</sup>40<sup>s</sup>  
**Dec:** –59°42′

**1-GHz flux/Jy:** 1.4?  
**Spectral index:** ?

**Size/arcmin:** 26×6  
**Type:** S?

**Radio:** Double, elongated arc.

**Optical:** Detected.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43′×50′ : S = 1.6 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-  
 tions.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G289.7–0.3**

**RA:** 11<sup>h</sup>01<sup>m</sup>15<sup>s</sup>  
**Dec:** –60°18′

**1-GHz flux/Jy:** 6.2  
**Spectral index:** 0.2?

**Size/arcmin:** 18×14  
**Type:** S

**Radio:** Incomplete shell.

**Point sources:** Compact radio source near centre.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43′×50′ : S = 6.4±0.5 Jy), plus Parkes 64-m at 4.5 GHz  
 (S = 7.5±2.5 Jy) and 8.55 GHz (S = 3.6±0.9 Jy).

**G290.1–0.8**

**RA:** 11<sup>h</sup>03<sup>m</sup>05<sup>s</sup>  
**Dec:** –60°56′

**1-GHz flux/Jy:** 42  
**Spectral index:** 0.4

MSH 11–61A

**Size/arcmin:** 19×14  
**Type:** S

**Radio:** Elongated, clumpy shell.

**Optical:** Filaments detected.

**X-ray:** Centrally brightened.

**Point sources:** Pulsar nearby.

**Distance:** H<sub>I</sub> absorption indicates 7±1 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4:  $S=20.2$  Jy).  
 Elliott & Malin 1979, MNRAS, 186, 45P. Optical image and spectra.  
 Kirshner & Winkler 1979, ApJ, 227, 853. Optical observations.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (4.4′×5.0′′).  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz (43′×49′′ :  $S=45\pm11$  Jy), and Parkes 64-m at 8.4 GHz (3′ :  $S=19.5\pm1.0$  Jy), including polarisation.  
 Seward 1990, ApJS, 73, 781. Einstein observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×49′′ :  $S=43$  Jy).  
 Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.  
 Kaspi *et al.* 1997, ApJ, 485, 820. Pulsar detection.  
 Gotthelf & Kaspi 1998, ApJ, 497, L29. ASCA observations of pulsar.  
 Slane *et al.* 2002, ApJ, 564, 284. ASCA observations.  
 Filipović *et al.* 2005, SerAJ, 170, 47. ATCA at 1.4 GHz (21′′), plus other observations, including CO of surroundings.  
 Reynoso *et al.* 2006, MNRAS, 369, 416. ATCA at 1.4 GHz (22′′5×25′′0) including H<sub>I</sub>.

**G291.0–0.1**

**RA:** 11<sup>h</sup>11<sup>m</sup>54<sup>s</sup>  
**Dec:** –60°38′

**1-GHz flux/Jy:** 16  
**Spectral index:** 0.29

(MSH 11–62)

**Size/arcmin:** 15×13  
**Type:** C

**Radio:** Centrally brightened core, with surrounding arcs.

**Optical:** Detected.

**X-ray:** Centrally brightened.

**Point sources:** Central compact X-ray source.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Roger *et al.* 1986, MNRAS, 219, 815. MOST at 843 MHz (43′×50′′ :  $S=17.2\pm1.0$  Jy), and Parkes 64-m at 5 and 8.4 GHz (4′6 and 3′ :  $S=10.4\pm0.4$  Jy and 9′1±0.2), with polarisation.  
 Wilson 1986, ApJ, 302, 718. Einstein observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×49′′ :  $S=12.7$  Jy).  
 Harrus *et al.* 1998, ApJ, 499, 273. ASCA observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.  
 Slane *et al.* 2012, ApJ, 749, 131. Chandra, XMM and Fermi observations.

**G292.0+1.8**

**RA:** 11<sup>h</sup>24<sup>m</sup>36<sup>s</sup>  
**Dec:** –59°16′

**1-GHz flux/Jy:** 15  
**Spectral index:** 0.4

MSH 11–54

**Size/arcmin:** 12×8  
**Type:** C

**Radio:** Centrally brightened source surrounded by a plateau of faint emission.

**Optical:** Oxygen rich.

**X-ray:** Ring of emission, with diffuse central nebula and pulsar.

**Point sources:** Central pulsar.

**Distance:** H<sub>I</sub> absorption implies 6.0 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Lockhart *et al.* 1977, MNRAS, 179, 147. Fleurs at 1415 MHz (50′ :  $S=13.0$  Jy).  
 Goss *et al.* 1979, MNRAS, 188, 357. Optical spectra.  
 Clark *et al.* 1980, MNRAS, 193, 129. X-ray spectrum.  
 Tuohy *et al.* 1982, ApJ, 260, L65. Einstein observations.  
 Dopita & Tuohy 1984, ApJ, 282, 135. Optical spectra.  
 Braun *et al.* 1986, A&A, 162, 259. MOST at 843 MHz (0′.8) and IRAS.  
 Hughes & Singh 1994, ApJ, 422, 126. EXOSAT spectrum.  
 Sutherland & Dopita 1995, ApJ, 439, 365. Spectrophotometry.  
 Hughes *et al.* 2001, ApJ, 559, L153. Chandra observations, including central nebula.  
 Camilo *et al.* 2002, ApJ, 567, L71. Pulsar detection.  
 Park *et al.* 2002, ApJ, 564, L39. Chandra observations.  
 Gonzalez & Safi-Harb 2003, ApJ, 583, L91. Chandra observations.  
 Hughes *et al.* 2003, ApJ, 591, L139. Chandra observations of pulsar.

Gaensler & Wallace 2003, ApJ, 594, 326. ATCA at 1.4, 2.3 and 5.2 GHz (9′.6×8′.0, 7′.2×6′.2 and 5′.5×4′.8 :  $S=11.9\pm 0.1, 11.4\pm 0.1$  and  $8.8\pm 0.1$ ), plus H<sub>I</sub> observations.  
 Park *et al.* 2004, ApJ, 602, L33. Chandra observations.  
 Vink *et al.* 2004, NuPhS, 132, 62. XMM observations.  
 Ghavamian *et al.* 2005, ApJ, 635, 365. Optical imaging spectroscopy.  
 Winkler & Long 2006, AJ, 132, 360. Optical observations.  
 Park *et al.* 2007, ApJ, 670, L121. Chandra observations.  
 Zharikov *et al.* 2008, A&A, 492, 805. Possible optical counterpart to pulsar and nebula.  
 Winkler *et al.* 2009, ApJ, 692, 1489. Optical proper motion studies.  
 Ghavamian *et al.* 2009, ApJ, 696, 1307. Spitzer spectroscopy.  
 Lee *et al.* 2009, ApJ, 706, 441. IR observations.  
 Lee *et al.* 2010, ApJ, 711, 861. Chandra observations.  
 Ghavamian *et al.* 2012, ApJ, 750, 39. Spitzer observations  
 Zharikov *et al.* 2013, A&A, 554, A120. IR of pulsar wind nebula.

**G292.2–0.5**

**RA:** 11<sup>h</sup>19<sup>m</sup>20<sup>s</sup>  
**Dec:** –61°28′

**1-GHz flux/Jy:** 7  
**Spectral index:** 0.5

**Size/arcmin:** 20×15  
**Type:** S

**Radio:** Shell.

**X-ray:** Shell, brighter to W, with central nebula.

**Point sources:** Central, young pulsar.

**Distance:** H<sub>I</sub> absorption indicates 8.4 kpc.

**References:**

Camilo *et al.* 2000, ApJ, 541, 367. Pulsar detection.  
 Crawford *et al.* 2001, ApJ, 554, 152. ATCA at 1.4 GHz (29′×25′ :  $S=5.6\times 0.3$  Jy) and 2.5 GHz (21′×20′).  
 Pivovarov *et al.* 2001, ApJ, 554, 161. ROSAT and ASCA observations.  
 Gonzalez & Safi-Harb 2003, ApJ, 591, L143. Chandra observations of pulsar.  
 Caswell *et al.* 2004, MNRAS, 352, 1405. ATCA at 5 GHz (1′ :  $S=2.8$  Jy), including polarisation, and 1.4 GHz for H<sub>I</sub> absorption.

Gonzalez & Safi-Harb 2005, ApJ, 619, 856. Chandra observations.  
 Gonzalez *et al.* 2005, ApJ, 630, 489. XMM observations of pulsar.  
 Safi-Harb *et al.* 2008, ApJ, 684, 532. Chandra observations of pulsar and nebula.  
 Kumar *et al.* 2012, ApJ, 754, 96. Chandra and XMM observations.  
 Ng *et al.* 2012, ApJ, 761, 65. XMM observations.

**G293.8+0.6**

**RA:** 11<sup>h</sup>35<sup>m</sup>00<sup>s</sup>  
**Dec:** –60°54′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.6?

**Size/arcmin:** 20  
**Type:** C

**Radio:** Central source, with faint extended plateau.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=9.0$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S=2.1$  Jy).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz

(44′×51′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×49′ :  $S=2.6$  Jy).



**G294.1–0.0**

**RA:** 11<sup>h</sup>36<sup>m</sup>10<sup>s</sup>  
**Dec:** –61°38′

**1-GHz flux/Jy:** >2?  
**Spectral index:** ?

**Size/arcmin:** 40  
**Type:** S

**Radio:** Faint shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43′×49′:S>2).

**G296.1–0.5**

**RA:** 11<sup>h</sup>51<sup>m</sup>10<sup>s</sup>  
**Dec:** –62°34′

**1-GHz flux/Jy:** 8?  
**Spectral index:** 0.6?

**Size/arcmin:** 37×25  
**Type:** S

Incorporates the previously catalogued remnant G296.1–0.7. Has been called G296.05–0.50.

**Radio:** Irregular shell, with nearby HII regions.

**Optical:** Detected.

**X-ray:** Irregular, incomplete shell.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:S=6.9 Jy) and Parkes 64-m at 5 GHz (4′:S>0.74).  
 Longmore *et al.* 1977, MNRAS, 181, 541. Optical spectra.  
 van den Bergh 1978, ApJS, 38, 119. Optical observations.  
 Markert *et al.* 1981, ApJ, 248, L17. Einstein observations.  
 Caswell & Barnes 1983, ApJ, 271, L55. Molonglo at 408 MHz (3′:S=12.4 Jy).  
 Bignami *et al.* 1986, ApJ, 302, 606. EXOSAT and Einstein ob-

servations.  
 Hwang & Markert 1994, ApJ, 431, 819. ROSAT observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×48′:S>2.4).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Castro *et al.* 2011, ApJ, 734, 86. XMM observations.  
 Gök & Sezer 2012, MNRAS, 419, 1603. Suzaku observations.

**G296.5+10.0**

**RA:** 12<sup>h</sup>09<sup>m</sup>40<sup>s</sup>  
**Dec:** –52°25′

**1-GHz flux/Jy:** 48  
**Spectral index:** 0.5

**PKS 1209–51/52**  
**Size/arcmin:** 90×65  
**Type:** S

Has been called G296.5+9.7.

**Radio:** Shell with two bright limbs.

**Optical:** Detected.

**X-ray:** Incomplete shell, with central pulsar.

**Point sources:** Central pulsar.

**References:**

Irvine & Irvine 1974, ApJ, 192, L111. Optical observations.  
 Danziger & Deneffeld 1976, PASP, 88, 44. Optical spectra.  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).  
 Tuohy *et al.* 1979, ApJ, 230, L27. X-ray detection with HEAO-1 A2 experiment.  
 Ruiz 1983, AJ, 88, 1210. Optical spectra.  
 Dubner *et al.* 1986, AJ, 91, 343. Argentine 30-m dish at 1.4 GHz (34′), plus HI.  
 Kellett *et al.* 1987, MNRAS, 225, 199. EXOSAT of the west of the remnant, including the compact source.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44′×56′).  
 Matsui *et al.* 1988, ApJ, 329, 838. Einstein observations, including compact source.  
 Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44′×56′).  
 Bignami *et al.* 1992, ApJ, 389, L67. Optical in vicinity of X-ray source.  
 Milne & Haynes 1994, MNRAS, 270, 106. Parkes 64-m at 2.4 GHz (8′.3: S=33±3 Jy), 4.8 GHz (4′.5: S=23.3±3 Jy)

and 8.4 GHz (3′.0: 18.8±3), including polarisation and review of flux densities.  
 Mereghetti *et al.* 1996, ApJ, 464, 842. Radio, optical and X-ray observations of central source.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.  
 Vasisht *et al.* 1997, ApJ, 476, L43. ASCA observations of neutron star.  
 Zavlin *et al.* 1998, A&A, 331, 821. ROSAT and ASCA observations of neutron star.  
 Giacani *et al.* 2000, AJ, 119, 281. ATCA at 1.4 GHz (2′.7×4′.0) for HI studies.  
 Zavlin *et al.* 2000, ApJ, 540, L25. Chandra observations of central pulsar.  
 Gotthelf & Halpern 2007, ApJ, 664, L35. X-ray timing observations of pulsar.  
 Harvey-Smith *et al.* 2010, ApJ, 712, 1157. ATCA at 1.4 GHz (1′.8×3′.3), including polarisation.  
 Araya *et al.* 2013, MNRAS, 434, 2202. Fermi observations.

**G296.7–0.9**

**RA:** 11<sup>h</sup>55<sup>m</sup>30<sup>s</sup>  
**Dec:** –63°08′

**1-GHz flux/Jy:** 3  
**Spectral index:** 0.5

**Size/arcmin:** 15×8  
**Type:** S

**Radio:** Bilateral shell.

**X-ray:** Brighter to SE.

**References:**

Schaudel *et al.* 2002, ASPC, 271, 391. ROSAT observations.  
 Robbins *et al.* 2012, MNRAS, 419, 2623. ATCA at 1.4 GHz  
 (33″×45″ :  $S = 2.5 \pm 0.2$  Jy), plus MOST at 843 MHz  
 (43″×49″), plus other observations.  
 Prinz & Becker 2013, A&A, 550, A33. XMM observations.

**G296.8–0.3**

**RA:** 11<sup>h</sup>58<sup>m</sup>30<sup>s</sup>  
**Dec:** –62°35′

**1-GHz flux/Jy:** 9  
**Spectral index:** 0.6

1156–62  
**Size/arcmin:** 20×14  
**Type:** S

**Radio:** Shell, brighter to the NW.

**X-ray:** Detected.

**Distance:** H I absorption gives 9.6 kpc.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  
 $S = 15.0$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 3.2$  Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier  
 Parkes 64-m maps at 2.7 GHz (8′4) and 5 GHz (4′4).  
 Hwang & Markert 1994, ApJ, 431, 819. ROSAT observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″×48″ :  $S = 9.2$  Jy).  
 Gaensler *et al.* 1998, MNRAS, 296, 813. ATCA at 1.3 GHz  
 (22″×24″ :  $S = 7.0 \pm 0.3$  Jy), including polarisation and H I  
 observations, plus review of flux densities.  
 Sánchez-Ayaso *et al.* 2012, Ap&SS, 337, 573. XMM and IR  
 observations.

**G298.5–0.3**

**RA:** 12<sup>h</sup>12<sup>m</sup>40<sup>s</sup>  
**Dec:** –62°52′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.4?

**Size/arcmin:** 5?  
**Type:** ?

**Radio:** Not well resolved, may be part of a larger ring?

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz  
 (3′) and Parkes 64-m at 5 GHz (4′).  
 Hwang & Markert 1994, ApJ, 431, 819. ROSAT upper limit.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×48″ :  $S = 1.8$  Jy).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G298.6–0.0**

**RA:** 12<sup>h</sup>13<sup>m</sup>41<sup>s</sup>  
**Dec:** –62°37′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.3

**Size/arcmin:** 12×9  
**Type:** S

Has been called G298.6–0.1.

**Radio:** Incomplete shell, in complex region.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz  
 (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz  
 (44″×50″).

Hwang & Markert 1994, ApJ, 431, 819. ROSAT upper limit.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×48″ :  $S = 7.4$  Jy).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G299.2–2.9**

**RA:** 12<sup>h</sup>15<sup>m</sup>13<sup>s</sup>  
**Dec:** –65°30′

**1-GHz flux/Jy:** 0.5?  
**Spectral index:** ?

**Size/arcmin:** 18×11  
**Type:** S

**Radio:** Faint source.

**Optical:** Filaments in W.

**X-ray:** Centrally brightened with shell at higher energies.

**References:**

Busser *et al.* 1996, A&A, 310, L1. ROSAT detection, plus optical studies.  
 Slane *et al.* 1996, ApJ, 465, 840. Einstein, IRAS and radio ob-

servations.  
 Bai & Wang 2000, ApJ, 539, 760. ASCA observations.  
 Park *et al.* 2007, ApJ, 665, 1173. Chandra observations.

**G299.6–0.5**

**RA:** 12<sup>h</sup>21<sup>m</sup>45<sup>s</sup>  
**Dec:** –63°09′

**1-GHz flux/Jy:** 1.0?  
**Spectral index:** ?

**Size/arcmin:** 13  
**Type:** S

**Radio:** Faint shell, brightest to E.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×48″:S=1.1 Jy).

**G301.4–1.0**

**RA:** 12<sup>h</sup>37<sup>m</sup>55<sup>s</sup>  
**Dec:** –63°49′

**1-GHz flux/Jy:** 2.1?  
**Spectral index:** ?

**Size/arcmin:** 37×23  
**Type:** S

**Radio:** Faint, incomplete shell, with possible extension to southwest.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×48″:S=2.3 Jy).

**G302.3+0.7**

**RA:** 12<sup>h</sup>45<sup>m</sup>55<sup>s</sup>  
**Dec:** –62°08′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.4?

**Size/arcmin:** 17  
**Type:** S

**Radio:** Distorted shell, in complex region, with possibly associated filament.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:S=7.5 Jy) and Parkes 64-m at 5 GHz (4′:S=3.0 Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×49″:S=3.2 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G304.6+0.1**

Kes 17

**RA:** 13<sup>h</sup>05<sup>m</sup>59<sup>s</sup>  
**Dec:** –62°42′**1-GHz flux/Jy:** 14  
**Spectral index:** 0.5**Size/arcmin:** 8  
**Type:** S**Radio:** Incomplete shell.**X-ray:** Detected.**Distance:** Possible limit of > 9.7 kpc from H I absorption.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4: S=6.9 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H I absorption.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×48″: S=18 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.

Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Combi *et al.* 2010, A&A, 523, A76. XMM observations  
 Lee *et al.* 2011, ApJ, 740, 31. AKARI and Spitzer observations.  
 Wu *et al.* 2011, ApJ, 740, L12. Fermi observations.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Gök & Sezer 2012, MNRAS, 423, 1215. Suzaku observations.  
 Gelfand *et al.* 2013, ApJ, 777, 148. ATCA at 1.4 GHz (8″×23″: S=10.9±0.4 Jy), plus other observations.

**G306.3–0.9****RA:** 13<sup>h</sup>21<sup>m</sup>50<sup>s</sup>  
**Dec:** –63°34′**1-GHz flux/Jy:** 0.16?  
**Spectral index:** 0.5?**Size/arcmin:** 4  
**Type:** S?**Radio:** Diffuse emission.**X-ray:** Partial shell.**References:**

Reynolds *et al.* 2013, ApJ, 766, 112. Chandra observations, and ATCA at 5.5 GHz (23″×26″), and 9 GHz.

**G308.1–0.7****RA:** 13<sup>h</sup>37<sup>m</sup>37<sup>s</sup>  
**Dec:** –63°04′**1-GHz flux/Jy:** 1.2?  
**Spectral index:** ?**Size/arcmin:** 13  
**Type:** S**Radio:** Faint shell.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×48″: S=1.3 Jy).

**G308.4–1.4****RA:** 13<sup>h</sup>41<sup>m</sup>30<sup>s</sup>  
**Dec:** –63°44′**1-GHz flux/Jy:** 0.4?  
**Spectral index:** ?**Size/arcmin:** 12×6?  
**Type:** S?

W part has been called G308.3–1.4.

**Radio:** Complex structure, with multiple arcs.**X-ray:** Limb brightened partial shell in W.**References:**

Schaudel *et al.* 2002, ASPC, 271, 391. ROSAT observations.  
 Prinz & Becker 2012, A&A, 544, A7. ATCA at 1.4 GHz (53″×64″: S=0.33 Jy) and 2.5 GHz (29″×35″: S=0.24 Jy), plus Chandra and other observations.

Hui *et al.* 2012, ApJ, 750, 7. XMM and other observations.  
 De Horta *et al.* 2013, MNRAS, 428, 1980. ATCA at 1.4 GHz (54″×65″) and 2.5 GHz (29″×35″), plus other observations.

**G308.8–0.1**

**RA:** 13<sup>h</sup>42<sup>m</sup>30<sup>s</sup>  
**Dec:** –62°23′

**1-GHz flux/Jy:** 15?  
**Spectral index:** 0.4?

**Size/arcmin:** 30×20?  
**Type:** C?

Incorporates previous catalogued remnant G308.7+0.0.

**Radio:** Bright ridge in north, and arc to south.

**Point sources:** Pulsar near centre of remnant.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 16.7$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 7.0$  Jy).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4 :  $S = 6.5$  Jy).  
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50′).  
 Wilson 1986, ApJ, 302, 718. Lack of detection with Einstein.

Caswell *et al.* 1992, ApJ, 399, L151. MOST at 843 MHz (43″×49″).  
 Kaspi *et al.* 1992, ApJ, 399, L155. Pulsar observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G309.2–0.6**

**RA:** 13<sup>h</sup>46<sup>m</sup>31<sup>s</sup>  
**Dec:** –62°54′

**1-GHz flux/Jy:** 7?  
**Spectral index:** 0.4?

**Size/arcmin:** 15×12  
**Type:** S

Has been called G309.2–0.7.

**Radio:** Distorted shell.

**X-ray:** Extended emission, with unrelated central source.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 10.0$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 3.9$  Jy).  
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (1′5).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″×50″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×48″ :  $S = 6$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Gaensler *et al.* 1998, MNRAS, 299, 812. ATCA at 1.3 GHz (24″×23″ :  $S = 5.2 \pm 0.2$  Jy).  
 Rakowski *et al.* 2001, ApJ, 548, 258. ASCA and ROSAT observations.  
 Rakowski *et al.* 2006, ApJ, 649, L111. Observations of central source.  
 Safi-Harb *et al.* 2007, ApJ, 659, 407. Observations of central source.

**G309.8+0.0**

**RA:** 13<sup>h</sup>50<sup>m</sup>30<sup>s</sup>  
**Dec:** –62°05′

**1-GHz flux/Jy:** 17  
**Spectral index:** 0.5

**Size/arcmin:** 25×19  
**Type:** S

**Radio:** Distorted shell.

**Point sources:** Steep radio spectrum source near the centre of the remnant.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 26.4$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 7.4$  Jy).  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (1′).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×49″ :  $S > 8.8$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G310.6–1.6**

**RA:** 14<sup>h</sup>00<sup>m</sup>45<sup>s</sup>  
**Dec:** –63°26′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 2.5  
**Type:** C?

**X-ray:** Bright central nebula, with faint shell.

**Point sources:** X-ray pulsar.

**References:**

Renaud *et al.* 2010, ApJ, 716, 663. Chandra and other observations.

**G310.6–0.3**

**RA:** 13<sup>h</sup>58<sup>m</sup>00<sup>s</sup>  
**Dec:** –62°09′

**1-GHz flux/Jy:** 5?  
**Spectral index:** ?

Kes 20B

**Size/arcmin:** 8  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×49″:  $S=5.4$  Jy).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G310.8–0.4**

**RA:** 14<sup>h</sup>00<sup>m</sup>00<sup>s</sup>  
**Dec:** –62°17′

**1-GHz flux/Jy:** 6?  
**Spectral index:** ?

Kes 20A

**Size/arcmin:** 12  
**Type:** S

**Radio:** Arc in E, in complex region.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×49″:  $S=6.9$  Jy).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G311.5–0.3**

**RA:** 14<sup>h</sup>05<sup>m</sup>38<sup>s</sup>  
**Dec:** –61°58′

**1-GHz flux/Jy:** 3?  
**Spectral index:** 0.5

**Size/arcmin:** 5  
**Type:** S

**Radio:** Shell, not well resolved.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz  
 (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell & Barnes 1985, MNRAS, 216, 753. Molonglo at  
 408 MHz (3′).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×49″:  $S=2.9$  Jy).  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G312.4–0.4**

**RA:** 14<sup>h</sup>13<sup>m</sup>00<sup>s</sup>  
**Dec:** –61°44′

**1-GHz flux/Jy:** 45  
**Spectral index:** 0.36

**Size/arcmin:** 38  
**Type:** S

**Radio:** Irregular, incomplete shell.

**X-ray:** Weak emission in W.

**Point sources:** Nearby  $\gamma$ -ray sources and pulsars.

**Distance:** H<sub>I</sub> absorption suggests > 6 kpc and possibly > 14 kpc.

**References:**

Caswell & Barnes 1985, MNRAS, 216, 753. Molonglo at  
 408 MHz (3′:  $S=56$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×49″:  $S > 19$ ), plus Parkes 64-m at 4.5 GHz ( $S =$   
 $30 \pm 2$  Jy) and 8.55 GHz ( $S = 17 \pm 4$  Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

Case & Bhattacharya 1999, ApJ, 521, 246. Nearby  $\gamma$ -ray  
 sources.  
 Roberts *et al.* 1999, ApJ, 515, 712. MOST at 843 MHz  
 (43″×49″).  
 Doherty *et al.* 2003, MNRAS, 339, 1048. ATCA at 1.4 GHz  
 (25″) plus H<sub>I</sub> absorption, and Chandra observations.

**G312.5–3.0****RA:** 14<sup>h</sup>21<sup>m</sup>00<sup>s</sup>**Dec:** –64°12′**1-GHz flux/Jy:** 3.5?**Spectral index:** ?**Size/arcmin:** 20×18**Type:** S**Radio:** Distorted shell.**References:**Duncan *et al.* 1995, MNRAS, 277, 36. Parkes 64-m at 2.4-GHz (10′.4)

Kane &amp; Vaughan 2003, MNRAS, 344, 625. ATCA at 1.4 GHz (129″×116″) and 2.4 GHz (75″×67″).

**G315.1+2.7****RA:** 14<sup>h</sup>24<sup>m</sup>30<sup>s</sup>**Dec:** –57°50′**1-GHz flux/Jy:** ?**Spectral index:** ?**Size/arcmin:** 190×150**Type:** S**Radio:** Poorly defined shell.**Optical:** Filaments, brighter in NE.**References:**Duncan *et al.* 1997, MNRAS, 287, 722. Parkes 64-m at 2.4 GHz (11′:  $S=19\pm 3$  Jy).Combi *et al.* 1998, A&A, 333, 298. Radio survey observations.Stupar *et al.* 2007, MNRAS, 374, 1441. Optical and various radio observations.Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G315.4–2.3**

**RA:** 14<sup>h</sup>43<sup>m</sup>00<sup>s</sup>  
**Dec:** –62°30′

**1-GHz flux/Jy:** 49  
**Spectral index:** 0.6

RCW 86, MSH 14–63

**Size/arcmin:** 42  
**Type:** S

Possibly the remnant of the SN of AD185?

**Radio:** Shell, brightest to the SW.

**Optical:** Bright, radiative filaments, with some faint Balmer dominated filaments.

**X-ray:** Partial shell, with thermal and non-thermal emission.

**Point sources:** Several X-ray sources.

**Distance:** Optical observations imply 2.3 kpc.

**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical observations.  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $3' : S=86$  Jy) and Parkes 64-m at 5 GHz ( $4' : S=18.2$  Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ( $8.4'$ ) and 5 GHz ( $4.4'$ ).  
 Winkler 1978, ApJ, 221, 220. X-ray detection.  
 Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.  
 Pisarski *et al.* 1984, ApJ, 277, 710. Einstein observations  
 Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ( $44'' \times 50''$ ).  
 Long & Blair 1990, ApJ, 358, L13. Balmer dominated optical filaments.  
 Greidanus & Strom 1990, A&A, 240, 385. IRAS observations.  
 Kaastra *et al.* 1992, A&A, 264, 654. Ginga X-ray spectra.  
 Strom 1994, MNRAS, 268, L5. Historical association  
 Chin & Huang 1994, Nature, 371, 398. Questioning of historical association.  
 Schaefer 1995, AJ, 110, 1793. Questioning of historical association.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 48'' : S > 22$ ).  
 Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Smith *et al.* 1997, AJ, 114, 2664. Observations of Balmer dominated filaments.  
 Vink *et al.* 1997, A&A, 328, 628. ASCA spectroscopy.  
 Bocchino *et al.* 2000, A&A, 360, 671. BeppoSAX observations of N and SW.

Bamba *et al.* 2000, PASJ, 52, 1157. ASCA observations.  
 Ghavamian *et al.* 2001, ApJ, 547, 995. Optical spectroscopy.  
 Dickel *et al.* 2001, ApJ, 546, 447. ATCA at 1.34 GHz ( $8''$ ), including polarisation.  
 Borkowski *et al.* 2001, ApJ, 550, 334. ASCA observations.  
 Rho *et al.* 2002, ApJ, 581, 1116. Chandra observations.  
 Gvaramadze & Vikhlinin 2003, A&A, 401, 625. Chandra point source search.  
 Sollerman *et al.* 2003, A&A, 407, 249. Optical spectroscopy.  
 Kaplan *et al.* 2004, ApJS, 153, 269. Chandra limits for any compact source.  
 Bamba *et al.* 2005, ApJ, 621, 793. Chandra observations of rim.  
 Vink *et al.* 2006, ApJ, 648, L33. Chandra and XMM observations.  
 Ueno *et al.* 2007, PASJ, 59, S171. Suzaku observations.  
 Aharonian *et al.* 2009, ApJ, 692, 1500.  $\gamma$ -ray observations.  
 Yamaguchi *et al.* 2011, PASJ, 63, S837. Suzaku observations.  
 Helder *et al.* 2011, ApJ, 737, 85. XMM and optical observations.  
 Williams *et al.* 2011, ApJ, 741, 96. Spitzer observations.  
 Mignani *et al.* 2012, MNRAS, 425, 2309. X-ray and optical observations of compact X-ray sources.  
 Lemoine-Goumard *et al.* 2012, A&A, 545, A28.  $\gamma$ -ray observations.  
 Helder *et al.* 2013, MNRAS, 435, 910. Optical proper motion studies.  
 Castro *et al.* 2013, ApJ, 779, 49. Chandra of NW.

**G315.4–0.3**

**RA:** 14<sup>h</sup>35<sup>m</sup>55<sup>s</sup>  
**Dec:** –60°36′

**1-GHz flux/Jy:** 8  
**Spectral index:** 0.4

**Size/arcmin:** 24×13  
**Type:** ?

**Radio:** Irregular non-thermal emission, with HII region superposed in E.

**Optical:** Detected.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ( $3' : S=15.9$  Jy) and Parkes 64-m at 5 GHz ( $4' : S=4.9$  Jy).  
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz ( $50'' : S=6.25$  Jy), re-assessment of earlier flux densities.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

( $43'' \times 49'' : S=3.1$  Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.



**G315.9–0.0**

**RA:** 14<sup>h</sup>38<sup>m</sup>25<sup>s</sup>  
**Dec:** –60°11′

**1-GHz flux/Jy:** 0.8?  
**Spectral index:** ?

**Size/arcmin:** 25×14  
**Type:** S

Has been called G315.8–0.0.

**Radio:** Faint, distorted shell, with elongated trail to pulsar.

**Point sources:** Pulsar at end of radio trail.

**References:**

Kesteven *et al.* 1987, AuJPh, 40, 855. MOST at 843 MHz (44″×50″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×50″:S=0.9 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH

observations.  
 Camilo *et al.* 2009, ApJ, 703, L55. Pulsar detection.  
 Ng *et al.* 2012, ApJ, 746, 105. ATCA at 1.4, 2.5, 5 and 9 GHz, including polarisation, of pulsar trail.

**G316.3–0.0**

**RA:** 14<sup>h</sup>41<sup>m</sup>30<sup>s</sup>  
**Dec:** –60°00′

**1-GHz flux/Jy:** 20?  
**Spectral index:** 0.4

(MSH 14–57)  
**Size/arcmin:** 29×14  
**Type:** S

**Radio:** Distorted shell, with possible ‘blowout’.

**X-ray:** Detected.

**Distance:** H<sub>I</sub> absorption data suggests > 7.2 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H<sub>I</sub> absorption.  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′:S=16.7 Jy).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″×51″).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×50″:S=20 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.

**G317.3–0.2**

**RA:** 14<sup>h</sup>49<sup>m</sup>40<sup>s</sup>  
**Dec:** –59°46′

**1-GHz flux/Jy:** 4.7?  
**Spectral index:** ?

**Size/arcmin:** 11  
**Type:** S

**Radio:** Incomplete shell.

**Optical:** Detected.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×50″:S=5.2 Jy).  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G318.2+0.1**

**RA:** 14<sup>h</sup>54<sup>m</sup>50<sup>s</sup>  
**Dec:** –59°04′

**1-GHz flux/Jy:** >3.9?  
**Spectral index:** ?

**Size/arcmin:** 40×35  
**Type:** S

**Radio:** Faint shell, with central H<sub>II</sub> region.

**X-ray:** Sources within remnant.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×50″:S>4.3).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Bocchino *et al.* 2001, A&A, 367, 629. BeppoSAX and ROSAT observations.

**G318.9+0.4**

**RA:** 14<sup>h</sup>58<sup>m</sup>30<sup>s</sup>  
**Dec:** –58°29′

**1-GHz flux/Jy:** 4?  
**Spectral index:** 0.2?

**Size/arcmin:** 30×14  
**Type:** C

May not be a SNR?

**Radio:** Complex arcs, with off-centre core.

**References:**

Whiteoak 1990, *Nature*, 347, 157. MOST at 843 MHz (43″×51″).  
 Whiteoak 1993, *ApJ*, 415, 701. MOST at 843 MHz (43″×51″ :  $S=4.8\pm0.6$  Jy), Parkes 64-m at 4.5 GHz (4′7″ :  $S=3.7\pm0.2$  Jy) and 8.4 GHz (2′8″ :  $S=3.0\pm0.4$  Jy) including polarisation, and

ATCA at 1.4 GHz and 4.8 GHz (11″×13″) of core.  
 Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43″×50″ :  $S=4.8$  Jy).  
 Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.

**G320.4–1.2**

**RA:** 15<sup>h</sup>14<sup>m</sup>30<sup>s</sup>  
**Dec:** –59°08′

**1-GHz flux/Jy:** 60?  
**Spectral index:** 0.4

**MSH 15–52, RCW 89**

**Size/arcmin:** 35  
**Type:** C

Has been suggested as the remnant of the SN of AD185?

**Radio:** Ragged shell.

**Optical:** RCW 89 is the H $\alpha$  emitting region to the NW.

**X-ray:** Partial shell, central nebula and pulsar and ‘jet’.

**Point sources:** Radio and X-ray pulsar, with wind nebula.

**Distance:** HI absorption indicates 5.2 kpc.

**References:**

Caswell *et al.* 1975, *A&A*, 45, 239. Parkes HI absorption.  
 Dickel & Milne 1976, *AuJPh*, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4″) and 5 GHz (4′4″).  
 Dopita *et al.* 1977, *ApJ*, 214, 179. Optical spectra.  
 Caswell *et al.* 1981, *MNRAS*, 195, 89. FIRST at 1415 MHz (50″).  
 Seward & Harnden 1982, *ApJ*, 256, L45. X-ray observations of pulsar.  
 Manchester *et al.* 1982, *ApJ*, 262, L31. Radio observations of pulsar.  
 Seward *et al.* 1983, *ApJ*, 267, 698. X-ray, Optical and IR.  
 van den Bergh & Kamper 1984, *ApJ*, 280, L51. Optical expansion.  
 Seward *et al.* 1984, *ApJ*, 281, 650. X-ray observations of pulsar and nebulosity.  
 Lortet *et al.* 1987, *A&A*, 180, 65. Optical observations.  
 Trussoni *et al.* 1990, *A&A*, 234, 403. EXOSAT observations.  
 Asaoka & Koyama 1990, *PASJ*, 42, 625. Ginga X-ray spectrum.  
 Arendt 1991, *AJ*, 101, 2160. IRAS observations, including compact source.  
 Milne *et al.* 1993, *MNRAS*, 264, 853. Parkes 64-m at 4.8 GHz (4′5″ :  $S=37\pm7$  Jy) and 8.4 GHz (3′0″ :  $S=24\pm4$  Jy), including polarisation and review of flux densities.  
 Strom 1994, *MNRAS*, 268, L5. Historical association.  
 Chin & Huang 1994, *Nature*, 371, 398. Questioning of historical association.  
 Matz *et al.* 1994, *ApJ*, 434, 288. X-ray observations of pulsar.  
 Schaefer 1995, *AJ*, 110, 1793. Questioning of historical association.  
 Du Plessis *et al.* 1995, *ApJ*, 453, 746. Hartesbeesthoek 26-m at 2.3, 5 and 8.5 GHz ( $S=42,35.6$  and 14.5 Jy).  
 Greiveldinger *et al.* 1995, *ApJ*, 454, 855. ROSAT observations.

Trussoni *et al.* 1996, *A&A*, 306, 581. ROSAT observations.  
 Tamura *et al.* 1996, *PASJ*, 48, L33. ASCA observations.  
 Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43″×50″ :  $S=62$  Jy).  
 Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.  
 Marsden *et al.* 1997, *ApJ*, 491, L39. X-ray spectroscopy.  
 Brazier & Becker 1997, *MNRAS*, 284, 335. ROSAT observations.  
 Gaensler *et al.* 1999, *MNRAS*, 305, 724. ATCA at 1.4 GHz (24″×21″), plus HI observations, and 5.3 GHz (15″×10″).  
 Sako *et al.* 2000, *ApJ*, 537, 422. Possible high energy  $\gamma$ -ray detection of pulsar.  
 Mineo *et al.* 2001, *A&A*, 380, 695. BeppoSAX observations.  
 Gaensler *et al.* 2002, *ApJ*, 569, 878. Chandra observations of pulsar and nebula.  
 Dubner *et al.* 2002, *AJ*, 123, 337. ATCA at 1.4 GHz (4′0″×2′7″), plus HI observations.  
 Aharonian *et al.* 2005, *A&A*, 435, L17.  $\gamma$ -ray detection.  
 Yatsu *et al.* 2005, *ApJ*, 631, 312. Chandra observations of pulsar and jet.  
 DeLaney *et al.* 2006, *ApJ*, 640, 929. Chandra and ROSAT multi-epoch observations of pulsar wind nebula.  
 Kaplan & Moon 2006, *ApJ*, 644, 1056. Possible IR detection of pulsar.  
 Forot *et al.* 2006, *ApJ*, 651, L45. X-ray observations of pulsar and nebula.  
 Nakamori *et al.* 2008, *ApJ*, 677, 297.  $\gamma$ -ray observations.  
 Yatsu *et al.* 2009, *PASJ*, 61, 129. Chandra observations of pulsar wind nebula.  
 Koo *et al.* 2011, *ApJ*, 732, 6. AKARI and Spitzer observations.

**G320.6–1.6**

**RA:** 15<sup>h</sup>17<sup>m</sup>50<sup>s</sup>  
**Dec:** –59°16′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 60×30  
**Type:** S

**Radio:** Faint shell, overlapping G320.4–1.2 in W.

**Optical:** Detected.

**References:**

Milne *et al.* 1993, MNRAS, 264, 853. Parkes 64-m at 4.8 GHz (4′5) and 8.4 GHz (3′0), including polarisation.  
 Duncan *et al.* 1995, MNRAS, 277, 36. Parkes 64-m at 2.4-GHz (10′4).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×50″:S>9.3).  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G321.9–1.1**

**RA:** 15<sup>h</sup>23<sup>m</sup>45<sup>s</sup>  
**Dec:** –58°13′

**1-GHz flux/Jy:** >3.4?  
**Spectral index:** ?

**Size/arcmin:** 28  
**Type:** S

**Radio:** Faint shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×51″:S>3.8).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G321.9–0.3**

**RA:** 15<sup>h</sup>20<sup>m</sup>40<sup>s</sup>  
**Dec:** –57°34′

**1-GHz flux/Jy:** 13  
**Spectral index:** 0.3

**Size/arcmin:** 31×23  
**Type:** S

**Radio:** Shell brighter to the W, with Cir X-1 to N.

**Point sources:** Compact, probably thermal source at S edge.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:S=18.3 Jy) and Parkes 64-m at 5 GHz (4′:S=7.8 Jy).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″×52″).  
 Stewart *et al.* 1993, MNRAS, 261, 593. ATCA at 1.5 GHz (21″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″×51″:S>8.3).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Mignani *et al.* 2002, A&A, 386, 487. HST proper motion study of Cir X-1.  
 Tudose *et al.* 2006, MNRAS, 372, 417. MOST at 843 MHz.

**G322.1+0.0**

**RA:** 15<sup>h</sup>20<sup>m</sup>49<sup>s</sup>  
**Dec:** –57°10′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 8×4.5?  
**Type:** S?

**Radio:** Circular shell, with extension to S.

**X-ray:** Diffuse emission.

**Point sources:** Cir X-1 HMXB at centre.

**References:**

Heinz *et al.* 2013, ApJ, 779, 171. Chandra observations and ATCA at 1.1–3.1 GHz (4′0×4′9).

**G322.5–0.1**

**RA:** 15<sup>h</sup>23<sup>m</sup>23<sup>s</sup>  
**Dec:** –57°06′

**1-GHz flux/Jy:** 1.5  
**Spectral index:** 0.4

**Size/arcmin:** 15  
**Type:** C

**Radio:** Shell with central extended source.

**Point sources:** PN Pe 2-8 within boundary.

**References:**

Whiteoak 1992, MNRAS, 256, 121. MOST at 843 MHz  
 (43″×51″ : S=2.0±0.3 Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×51″ : S = 1.7 Jy), plus Parkes 64-m at 4.5 GHz

(=0.89±0.13).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G323.5+0.1**

**RA:** 15<sup>h</sup>28<sup>m</sup>42<sup>s</sup>  
**Dec:** –56°21′

**1-GHz flux/Jy:** 3?  
**Spectral index:** 0.4?

**Size/arcmin:** 13  
**Type:** S

**Radio:** Distorted shell, confused with thermal emission.

**Point sources:** Compact, probably thermal source near centre.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 4.2 Jy) and Parkes 64-m at 5 GHz (4′ : S = 1.5 Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×52″ : S = 4.2 Jy).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G326.3–1.8**

**RA:** 15<sup>h</sup>53<sup>m</sup>00<sup>s</sup>  
**Dec:** –56°10′

**1-GHz flux/Jy:** 145  
**Spectral index:** varies

**MSH 15–56**  
**Size/arcmin:** 38  
**Type:** C

Has been called G326.2–1.7.

**Radio:** Shell, with elongated, flat-spectrum core.

**Optical:** Emission around the shell.

**X-ray:** Shell, with central extended emission.

**Point sources:** Compact X-ray source.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : S = 180 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H<sub>I</sub> absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz  
 (0.8 : S > 95) and Parkes 64-m at 14.7 GHz (2.2 : S = 69±8 Jy).  
 van den Bergh 1979, ApJ, 227, 497. Optical observations.  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical observations.  
 Dennefeld 1980, PASP, 92, 603. Optical spectra.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz  
 (44″×53″).  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz  
 (43″×52″ : S = 153±40 Jy), and Parkes 64-m at 8.4 GHz  
 (3′ : S = 68±5 Jy), including polarisation.  
 Seward 1990, ApJS, 73, 781. Einstein observations.

Kassim *et al.* 1993, ApJ, 419, 733. ROSAT image.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
 (43″×52″ : S > 130).  
 Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Dickel *et al.* 2000, ApJ, 543, 840. ATCA at 1.34 GHz  
 (8″5×6″4 : S > 60 Jy), 4.80 GHz (3″8 : S = 25 Jy for core  
 only) and 8.64 GHz (3″2 : S = 15 Jy for core only).  
 Temim *et al.* 2013, ApJ, 768, 61. XMM and Chandra observations.  
 Yatsu *et al.* 2013, ApJ, 773, 25. XMM and Chandra observations.

**G327.1–1.1**

**RA:** 15<sup>h</sup>54<sup>m</sup>25<sup>s</sup>  
**Dec:** –55°09′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**Size/arcmin:** 18  
**Type:** C

**Radio:** Shell, with off-centre core.

**X-ray:** Diffuse, with core.

**References:**

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8′4″:S=10±15% Jy).  
 Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:S=10.6 Jy) and Parkes 64-m at 5 GHz (4′:S=4.3 Jy).  
 Lamb & Markert 1981, ApJ, 244, 94. Einstein observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×52″:S=7.6 Jy).  
 Seward *et al.* 1996, ApJ, 471, 887. ROSAT observations.

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Sun *et al.* 1999, ApJ, 511, 274. ASCA and ROSAT observations.  
 Bocchino & Bandiera 2003, A&A, 398, 195. BeppoSAX observations.  
 Temim *et al.* 2009, ApJ, 691, 895. Chandra and XMM observations.

**G327.2–0.1**

**RA:** 15<sup>h</sup>50<sup>m</sup>55<sup>s</sup>  
**Dec:** –54°18′

**1-GHz flux/Jy:** 0.4  
**Spectral index:** ?

**Size/arcmin:** 5  
**Type:** S

Has been called G327.24–0.13.

**Radio:** Shell, possibly with central emission.

**Point sources:** Central pulsar (magnetar).

**References:**

Camilo *et al.* 2007, ApJ, 666, L93. Pulsar observations.  
 Gelfand & Gaensler 2007, ApJ, 667, 1111. Chandra and XMM observations, and 843 GHz (43″×53″:S=0.5±0.1 Jy) and SGPS at 1.4 GHz (S=0.3±0.1 Jy).

**G327.4+0.4**

**RA:** 15<sup>h</sup>48<sup>m</sup>20<sup>s</sup>  
**Dec:** –53°49′

**1-GHz flux/Jy:** 30?  
**Spectral index:** 0.6

**Size/arcmin:** 21  
**Type:** S

Kes 27

Has been called G327.3+0.4 and G327.3+0.5.

**Radio:** Incomplete, multi-arc shell, brightest to the SE.

**X-ray:** Diffuse, best defined to E.

**Distance:** HI absorption indicates 4.3 to 5.4 kpc.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′:S=58 Jy) and Parkes 64-m at 5 GHz (4′:S=12.4 Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4″) and 5 GHz (4′4″).  
 Lamb & Markert 1981, ApJ, 244, 94. Einstein observations.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″×55″).  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz (43″×53″:S=32.2±6 Jy), and Parkes 64-m at 8.4 GHz (3′:S=9.4±0.8 Jy), including polarisation.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″×53″:S=25 Jy).  
 Seward *et al.* 1996, ApJ, 471, 887. ROSAT observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.  
 McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes 64-m at 1.4 GHz (2′0″×1′8″), plus HI.  
 Enoguchi *et al.* 2002, PASJ, 54, 229. ASCA observations.  
 Kawasaki *et al.* 2005, ApJ, 631, 935. ASCA observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Chen *et al.* 2008, ApJ, 676, 1040. Chandra observations.

**G327.4+1.0****RA:** 15<sup>h</sup>46<sup>m</sup>48<sup>s</sup>**Dec:** –53°20′**1-GHz flux/Jy:** 1.9?**Spectral index:** ?**Size/arcmin:** 14**Type:** S**Radio:** Asymmetric shell.**References:**Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz  
(43′×54′; S=2.1 Jy).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.

McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes  
64-m at 1.4 GHz (2′0×1′8), plus HI.

**G327.6+14.6**

SN1006, PKS 1459–41

**RA:** 15<sup>h</sup>02<sup>m</sup>50<sup>s</sup>  
**Dec:** –41°56′**1-GHz flux/Jy:** 19  
**Spectral index:** 0.6**Size/arcmin:** 30  
**Type:** S

This is the remnant of the SN of AD1006.

**Radio:** Shell, with two bright arcs.

**Optical:** Filaments to the NW, with broad H $\alpha$  component.

**X-ray:** Thermal shell, with non-thermal limb-brightened arcs.

**Point sources:** The background Schweizer–Middleditch star is near the middle of the remnant.

**Distance:** Optical spectra and proper motion indicate 2.2 kpc.

**References:**

- van den Bergh 1976, ApJ, 208, L17. Optical observations.
- Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'4) and 5 GHz (4'4).
- Becker *et al.* 1980, ApJ, 240, L33. X-ray spectroscopy.
- Schweizer & Middleditch 1980, ApJ, 241, 1039. Possible stellar remnant.
- Pye *et al.* 1981, MNRAS, 194, 569. Einstein observations.
- Caswell *et al.* 1983, MNRAS, 204, 921. FIRST at 1415 MHz (77").
- Reynolds & Gilmore 1986, AJ, 92, 1138. VLA at 1.37 and 1.67 GHz (16"×20").
- Kirshner *et al.* 1987, ApJ, 315, L135. Broad H $\alpha$  optical component.
- Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44"×66").
- Fesen *et al.* 1988, ApJ, 327, 164. UV absorption spectra of the Schweizer–Middleditch star.
- Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44"×66";  $S = 17.5 \pm 1.5$  Jy).
- Long *et al.* 1988, ApJ, 333, 749. Optical proper motion for distance.
- Jones & Pye 1989, MNRAS, 238, 567. EXOSAT observations.
- Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.
- Wu *et al.* 1993, ApJ, 416, 247. UV spectra.
- Reynolds & Gilmore 1993, AJ, 106, 272. VLA at 1.37 and 1.67 GHz (24"), including polarisation.
- Moffett *et al.* 1993, AJ, 106, 1566. VLA at 1.37 and 1.67 GHz (10"×14"), for proper motion studies.
- Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.
- Raymond *et al.* 1995, ApJ, 454, L31. Far UV spectroscopy.
- Koyama *et al.* 1995, Nature, 378, 255. ASCA observations.
- Willingale *et al.* 1996, MNRAS, 278, 749. ROSAT observations.
- Blair *et al.* 1996, ApJ, 468, 871. Optical absorption studies.
- Laming *et al.* 1996, ApJ, 472, 267. Modelling of optical spectra, including distance.
- Wu *et al.* 1997, ApJ, 477, L53. Far UV absorption spectra of the Schweizer–Middleditch star.
- Winkler & Long 1997, ApJ, 486, L137. UV absorption spectra of background quasar.
- Winkler & Long 1997, ApJ, 491, 829. ROSAT and optical images.
- Tanimori *et al.* 1998, ApJ, 497, L25.  $\gamma$ -ray detection.
- Vink *et al.* 2000, A&A, 354, 931. X-ray spectroscopy.
- Burleigh *et al.* 2000, A&A, 356, 585. Optical spectroscopy of the Schweizer–Middleditch star.
- Allen *et al.* 2001, ApJ, 558, 739. ASCA, ROSAT and other X-ray observations.
- Dubner *et al.* 2002, A&A, 387, 1047. ATCA at 1.4 GHz (4'7×3'0) for H $\alpha$ , plus CO observations.
- Ghavamian *et al.* 2002, ApJ, 572, 888. Optical of filaments in NW.
- Sollerman *et al.* 2003, A&A, 407, 249. Optical spectroscopy.
- Winkler *et al.* 2003, ApJ, 585, 324. Optical proper motion studies.
- Vink *et al.* 2003, ApJ, 587, L31. XMM observations.
- Bamba *et al.* 2003, ApJ, 589, 827. Chandra observations of NE.
- Korreck *et al.* 2004, ApJ, 615, 280. Far-uv observations.
- Aharonian *et al.* 2005, A&A, 437, 135.  $\gamma$ -ray limit.
- Winkler *et al.* 2005, ApJ, 624, 189. HST absorption towards background sources.
- Kalemci *et al.* 2006, ApJ, 640, L55.  $\gamma$ -ray limit upper limit.
- Kalemci *et al.* 2006, ApJ, 644, 274. Integral observations.
- Acero *et al.* 2007, A&A, 475, 883. XMM observations.
- Raymond *et al.* 2007, ApJ, 659, 1257. HST H $\alpha$  observations.
- Hamilton *et al.* 2007, MNRAS, 381, 771. UV spectroscopy of the Schweizer–Middleditch star.
- Bamba *et al.* 2008, AdSpR, 41, 411. Suzaku observations.
- Cassam-Chenai *et al.* 2008, ApJ, 680, 1180. ATCA and VLA at 1.5 GHz (6"×9") plus Chandra observations.
- Yamaguchi *et al.* 2008, PASJ, 60, S141. Suzaku observations.
- Bamba 2008, PASJ, 60, S153. Suzaku observations.
- Dyer *et al.* 2009, AJ, 137, 2956. GBT and VLA observations at 1.4 GHz.
- Winkler *et al.* 2011, ApJ, 742, 80. Multi-epoch UV spectroscopy of the Schweizer–Middleditch star.
- Miceli *et al.* 2012, A&A, 546, A66. XMM observations.
- Broersen *et al.* 2013, A&A, 552, A9. XMM observations of NW knot.
- Miceli *et al.* 2013, A&A, 550, A80. XMM observations.
- Katsuda *et al.* 2013, ApJ, 763, 85. Chandra proper motion study of NW.
- Winkler *et al.* 2013, ApJ, 764, 156. Spitzer observations.
- Uchida *et al.* 2013, ApJ, 771, 56. Suzaku observations.
- Reynoso *et al.* 2013, AJ, 145, 104. VLA and ATCA at 1.4 GHz (10"), including polarisation.
- Nikolić *et al.* 2013, Science, 340, 45. Optical spectroscopy.

**G328.4+0.2**

**RA:** 15<sup>h</sup>55<sup>m</sup>30<sup>s</sup>  
**Dec:** –53°17′

**1-GHz flux/Jy:** 15  
**Spectral index:** 0.0

(MSH 15–57)

**Size/arcmin:** 5  
**Type:** F

**Radio:** Amorphous emission, with central bar.

**X-ray:** Detected at high energies.

**Distance:** HI absorption indicates > 17.4 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50′).  
 Wilson 1986, ApJ, 302, 718. Lack of detection with Einstein.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×54′:S=15 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Gaensler *et al.* 2000, ApJ, 542, 380. ATCA at 1.4 GHz

(16′.5×19′.5 : S = 14.3±0.1 Jy) and 4.5 GHz (2′.0×1′.5 : S = 12.5±0.2 Jy).  
 Hughes *et al.* 2000, ApJ, 542, 386. ASCA observations.  
 McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes 64-m at 1.4 GHz (1′.8×2′.0), plus HI.  
 Johnston *et al.* 2004, MNRAS, 348, L19. ATCA at 19 GHz (6′.1×7′.7), including polarisation.  
 Gelfand *et al.* 2007, ApJ, 663, 468. ATCA at 1.4 GHz (5′.8×7′.0 : S = 13.8±0.4 Jy), plus XMM observations.

**G329.7+0.4**

**RA:** 16<sup>h</sup>01<sup>m</sup>20<sup>s</sup>  
**Dec:** –52°18′

**1-GHz flux/Jy:** >34?  
**Spectral index:** ?

**Size/arcmin:** 40×33  
**Type:** S

**Radio:** Diffuse shell, in complex region.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×53′:S>38).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes 64-m at 1.4 GHz (2′.0×1′.8), plus HI.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G330.0+15.0**

**RA:** 15<sup>h</sup>10<sup>m</sup>00<sup>s</sup>  
**Dec:** –40°00′

**1-GHz flux/Jy:** 350?  
**Spectral index:** 0.5?

Lupus Loop  
**Size/arcmin:** 180?  
**Type:** S

**Radio:** Low surface brightness loop with HI shell.

**X-ray:** Detected, with central source.

**Point sources:** Central, possibly pulsating, X-ray source.

**References:**

Milne 1971, AuJPh, 24, 757. Parkes 64-m at 408 MHz (48′), 635 MHz (31′) and 1410 MHz (15′).  
 Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8′.4 : S = 120±30% Jy).  
 Toor 1980, A&A, 85, 184. X-ray image and spectrum.  
 Colomb & Dubner 1982, A&A, 112, 141. Argentine 30-m dish

at 1.42 GHz (30′), HI observations.  
 Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.  
 Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.  
 Kaplan *et al.* 2006, ApJS, 163, 344. X-ray upper limit on compact sources.  
 Shinn *et al.* 2006, ApJ, 644, L189. Far UV observations.



**G330.2+1.0**

**RA:** 16<sup>h</sup>01<sup>m</sup>06<sup>s</sup>  
**Dec:** –51°34′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.3

**Size/arcmin:** 11  
**Type:** S?

**Radio:** Clumpy non-thermal emission, possibly a distorted shell.

**X-ray:** Shell.

**Point sources:** Central compact X-ray source.

**Distance:** H<sub>I</sub> absorption indicates > 4.9 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 8.6$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 4.0$  Jy).  
 Caswell *et al.* 1983, MNRAS, 204, 915. FIRST at 1415 MHz (52″ × 47″), and MOST at 843 MHz (43″ × 55″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 55″ :  $S = 4.7$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes 64-m at 1.4 GHz (2′0 × 1′8), plus H<sub>I</sub>.  
 Torii *et al.* 2006, PASJ, 58, L11. ASCA detection.  
 Park *et al.* 2009, ApJ, 695, 431. XMM and Chandra observations.

**G332.0+0.2**

**RA:** 16<sup>h</sup>13<sup>m</sup>17<sup>s</sup>  
**Dec:** –50°53′

**1-GHz flux/Jy:** 8?  
**Spectral index:** 0.5

**Size/arcmin:** 12  
**Type:** S

**Radio:** Incomplete shell.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 57″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 55″ :  $S = 8.9$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 McClure-Griffiths *et al.* 2001, ApJ, 551, 394. ATCA and Parkes 64-m at 1.4 GHz (2′0 × 1′8), plus H<sub>I</sub>.

**G332.4–0.4**

**RA:** 16<sup>h</sup>17<sup>m</sup>33<sup>s</sup>  
**Dec:** –51°02′

**1-GHz flux/Jy:** 28  
**Spectral index:** 0.5

RCW 103

**Size/arcmin:** 10  
**Type:** S

**Radio:** Shell, brightest to the S.

**Optical:** Filaments correspond well to the radio shell, brightest in SE.

**X-ray:** Brightest to NW, with point source near centre.

**Point sources:** Central, variable X-ray source, and nearby pulsar.

**Distance:** H<sub>i</sub> absorption indicates 3.1 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H<sub>i</sub> absorption.  
 Tuohy & Garmire 1980, ApJ, 239, L107. Einstein detection of X-ray point source.  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50′′).  
 Lamb & Markert 1981, ApJ, 244, 94. Einstein observations.  
 Ruiz 1983, AJ, 88, 1210. Optical spectra.  
 Tuohy *et al.* 1983, ApJ, 268, 778. X-ray observations.  
 Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.  
 Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum (and Einstein image from Tuohy, private communication).  
 Meaburn & Allen 1986, MNRAS, 222, 593. Optical spectra.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44′′×57′′).  
 Oliva *et al.* 1990, A&A, 240, 453. IR spectroscopy.  
 Dickel *et al.* 1996, AJ, 111, 340. ATCA at 1.36 (8′′) and 2.37 GHz (4′5′′), including polarisation.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′′×55′′; S=34 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Gotthelf *et al.* 1997, ApJ, 487, L175. ASCA observations of compact X-ray source.

Carter *et al.* 1997, PASP, 109, 990. Optical expansion.  
 Torii *et al.* 1998, ApJ, 494, L207. ASCA detection of nearby pulsar.  
 Kaspi *et al.* 1998, ApJ, 503, L161. Pulsar observations.  
 Gotthelf *et al.* 1999, ApJ, 514, L107. X-ray variability of central source.  
 Oliva *et al.* 1999, A&A, 343, 943. ISO spectroscopy.  
 Torii *et al.* 2000, ApJ, 534, L71. X-ray timing on pulsar, including glitch.  
 Reynoso *et al.* 2004, PASA, 21, 82. ATCA at 1.4 GHz (50′′), including H<sub>i</sub> absorption to central source.  
 Russeil *et al.* 2005, A&A, 429, 497. H $\alpha$  observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Paron 2006, PASA, 23, 69. CO and HCO<sup>+</sup> observations of surroundings.  
 De Luca 2006, Science, 313, 814. XMM observations of central source.  
 De Luca 2007, Ap&SS, 308, 231. XMM observation of periodicity of central source.  
 Matsumoto *et al.* 2007, PASJ, 59, S199. Suzaku observations.  
 De Luca 2008, ApJ, 682, 1185. IR observations of central source.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G332.4+0.1**

**RA:** 16<sup>h</sup>15<sup>m</sup>20<sup>s</sup>  
**Dec:** –50°42′

**1-GHz flux/Jy:** 26  
**Spectral index:** 0.5

MSH 16–51, Kes 32

**Size/arcmin:** 15  
**Type:** S

Has been called G332.4+0.2.

**Radio:** Distorted shell, with thermal jet and plume adjacent.

**Optical:** Detected.

**X-ray:** Shell, brightest to NW.

**Point sources:** Pulsar nearby.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Roger *et al.* 1985, Nature, 316, 44. MOST at 843 MHz (44′′×57′′).  
 Caraveo 1993, ApJ, 415, L111. Nearby pulsar.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′′×56′′; S=29 Jy).

Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Brinkmann *et al.* 1999, A&A, 346, 599. ROSAT image of remnant and nearby pulsar.  
 Vink *et al.* 2004, ApJ, 604, 693. Chandra observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G332.5–5.6**

**RA:** 16<sup>h</sup>43<sup>m</sup>20<sup>s</sup>  
**Dec:** –54°30′

**1-GHz flux/Jy:** 2?  
**Spectral index:** 0.7?

**Size/arcmin:** 35  
**Type:** S

**Radio:** Bipolar shell, with central emission also.

**Optical:** Patchy filaments.

**X-ray:** Emission from centre.

**References:**

Reynoso & Green 2007, MNRAS, 375, 92. ATCA at 1.4 GHz (40″ :  $S = 1.90 \pm 0.15$  Jy) and 2.4 GHz (90″ :  $S = 1.3 \pm 0.2$  Jy) including polarisation, and 843 MHz (43″ × 53″) plus ROSAT observations.

Stupar *et al.* 2007, MNRAS, 381, 377. Optical observations, plus ATCA at 1.4 GHz (58″) and 2.4 GHz (95″) including polarisation, and other observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G335.2+0.1**

**RA:** 16<sup>h</sup>27<sup>m</sup>45<sup>s</sup>  
**Dec:** –48°47′

**1-GHz flux/Jy:** 16  
**Spectral index:** 0.5

**Size/arcmin:** 21  
**Type:** S

**Radio:** Well defined shell.

**Point sources:** Old pulsar within remnant boundary.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 27.1$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 8.6$  Jy).  
 Kaspi *et al.* 1996, AJ, 111, 2028. Pulsar observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 57″ :  $S = 16$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.

**G336.7+0.5**

**RA:** 16<sup>h</sup>32<sup>m</sup>11<sup>s</sup>  
**Dec:** –47°19′

**1-GHz flux/Jy:** 6  
**Spectral index:** 0.5

**Size/arcmin:** 14 × 10  
**Type:** S

**Radio:** Irregular shell.

**Optical:** Detected.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 60″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 58″ :  $S = 6.1$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G337.0–0.1**

**RA:** 16<sup>h</sup>35<sup>m</sup>57<sup>s</sup>  
**Dec:** –47°36′

**1-GHz flux/Jy:** 1.5  
**Spectral index:** 0.6?

**Size/arcmin:** 1.5  
**Type:** S

(CTB 33)

This entry refers to a small (1.5) SNR, not the larger previously catalogued G337.0–0.1. Has mistakenly been called G337.7–0.1.

**Radio:** Shell, in a complex region.

**Point sources:** Associated with a soft gamma repeater.

**Distance:** Association with CTB 33 gives 11 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ :  $S = 21$  Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Sarma *et al.* 1997, ApJ, 483, 335. ATCA at 1.4 GHz (12″) including HI, and 8.9 GHz (13″ × 15″) for recombination lines,

clarifying extent of the remnant.  
 Woods *et al.* 1999, ApJ, 519, L139. Soft gamma repeater observations.  
 Hurley *et al.* 2000, ApJ, 528, L21. ASCA observations of soft gamma repeater.  
 Brogan *et al.* 2000, ApJ, 537, 875. VLA at 1.7 GHz for OH Zeeman splitting.  
 Castro *et al.* 2013, ApJ, 774, 36. Fermi observations.

**G337.2–0.7**

**RA:** 16<sup>h</sup>39<sup>m</sup>28<sup>s</sup>  
**Dec:** –47°51′

**1-GHz flux/Jy:** 1.5  
**Spectral index:** 0.4

**Size/arcmin:** 6  
**Type:** S

**Radio:** Shell, brighter in S.

**X-ray:** Extended emission.

**Distance:** HI absorption suggests 2.0 to 9.3 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 3.8$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 0.70$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ :  $S = 2.0$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

Rakowski *et al.* 2001, ApJ, 548, 258. ASCA and ROSAT observations.  
 Rakowski *et al.* 2006, ApJ, 646, 982. ATCA observations at 1.3 GHz (15″ :  $S = 1.55 \pm 0.05$  Jy) and 5 GHz (15″ :  $S = 0.93 \pm 0.02$  Jy), plus HI and Chandra observations.

**G337.2+0.1**

**RA:** 16<sup>h</sup>35<sup>m</sup>55<sup>s</sup>  
**Dec:** –47°20′

**1-GHz flux/Jy:** 1.5?  
**Spectral index:** ?

**Size/arcmin:** 3 × 2  
**Type:** ?

**Radio:** Not well defined.

**X-ray:** Detected.

**Distance:** Association with HI hole gives 14 kpc.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S = 1.6$  Jy)  
 Combi *et al.* 2005, A&A, 431, L9. ASCA and other observations.

Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray observations of nearby source.  
 Combi *et al.* 2006, ApJ, 653, L41. XMM observations.

**G337.3+1.0**

**RA:** 16<sup>h</sup>32<sup>m</sup>39<sup>s</sup>  
**Dec:** –46°36′

**1-GHz flux/Jy:** 16  
**Spectral index:** 0.55

**Size/arcmin:** 15 × 12  
**Type:** S  
 Kes 40

**Radio:** Nearly complete shell.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S = 24.6$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 7.2$  Jy).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′4) and 5 GHz (4′4).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 61″).  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz

(43″ × 59″ :  $S = 14.8 \pm 3.0$  Jy), and Parkes 64-m at 8.4 GHz (3′ :  $S = 5.1 \pm 0.6$  Jy), including polarisation.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S = 20$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G337.8–0.1**

**RA:** 16<sup>h</sup>39<sup>m</sup>01<sup>s</sup>  
**Dec:** –46°59′

**1-GHz flux/Jy:** 18  
**Spectral index:** 0.5

**Size/arcmin:** 9 × 6  
**Type:** S  
 Kes 41

**Radio:** Distorted shell.

**X-ray:** Centrally brightened.

**Distance:** HI absorption suggests 11 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S = 18$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA detection of compact

OH emission.  
 Caswell 2004, MNRAS, 349, 99. ATCA at 1.7 GHz, for associated OH masers.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Kothes & Dougherty 2007, A&A, 468, 993. SGPS at 1.4 GHz including HI.  
 Combi *et al.* 2008, A&A, 488, L25. XMM observations.

**G338.1+0.4**

**RA:** 16<sup>h</sup>37<sup>m</sup>59<sup>s</sup>  
**Dec:** –46°24′

**1-GHz flux/Jy:** 4?  
**Spectral index:** 0.4

**Size/arcmin:** 15?  
**Type:** S

**Radio:** Arc in NE, merging with thermal emission in S.

**Optical:** Detected.

**X-ray:** Detected.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical detection.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×59″:S=3.8 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Caswell 2004, MNRAS, 349, 99. ATCA at 1.7 GHz of associated OH masers.

**G338.3–0.0**

**RA:** 16<sup>h</sup>41<sup>m</sup>00<sup>s</sup>  
**Dec:** –46°34′

**1-GHz flux/Jy:** 7?  
**Spectral index:** ?

**Size/arcmin:** 8  
**Type:** C?

**Radio:** Irregular shell, in complex region.

**X-ray:** Central X-ray source and nebula.

**Point sources:** Central X-ray source.

**Distance:** HI observations suggest 8 to 13 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×59″:S=7.4 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Aharonian *et al.* 2005, Science, 307, 1938.  $\gamma$ -ray detection.  
 Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray observations.

Landi *et al.* 2006, ApJ, 651, 190. X-ray observations.  
 Funk *et al.* 2007, ApJ, 662, 517. XMM observations.  
 Lemiere *et al.* 2009, ApJ, 706, 1269. Chandra observations of central source and nebula.  
 Slane *et al.* 2010, ApJ, 720, 266. Fermi observations.  
 Castelletti *et al.* 2011, A&A, 536, A98. GMRT at 235 MHz (10″×26″), 610 MHz (5″0×12″6) and 1280 MHz (5″0×6″4), plus ATCA at 2.3 GHz (4″3×4″8).

**G338.5+0.1**

**RA:** 16<sup>h</sup>41<sup>m</sup>09<sup>s</sup>  
**Dec:** –46°19′

**1-GHz flux/Jy:** 12?  
**Spectral index:** ?

**Size/arcmin:** 9  
**Type:** ?

**Radio:** Circle of non-thermal emission in complex region, not well defined.

**Distance:** HI absorption suggests 11 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×59″:S=13 Jy).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Kothes & Dougherty 2007, A&A, 468, 993. SGPS at 1.4 GHz including HI.

**G340.4+0.4**

**RA:** 16<sup>h</sup>46<sup>m</sup>31<sup>s</sup>  
**Dec:** –44°39′

**1-GHz flux/Jy:** 5  
**Spectral index:** 0.4

**Size/arcmin:** 10×7  
**Type:** S

**Radio:** Distorted shell, elongated east–west.

**Optical:** Detected.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:S=8.2 Jy) and Parkes 64-m at 5 GHz (4′:S=2.9 Jy).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50″).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz (75″×48″:S=9.8±0.9 Jy) and 1.4 GHz (27″×9″:S=

3.6±0.1 Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×61″:S=5.9 Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G340.6+0.3**

**RA:** 16<sup>h</sup>47<sup>m</sup>41<sup>s</sup>  
**Dec:** –44°34′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.4?

**Size/arcmin:** 6  
**Type:** S

**Radio:** Incomplete shell.

**Optical:** Possible associated filaments.

**Distance:** HI absorption suggests 15 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 7.0$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 2.8$  Jy).  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical observations.  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50′).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz (75″ × 48″ :  $S = 9.2 \pm 0.9$  Jy) and 1.4 GHz (27″ × 9″ :  $S = 5.8 \pm 0.1$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 61″ :  $S = 4.5$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer possible detection.  
 Kothes & Dougherty 2007, A&A, 468, 993. SGPS at 1.4 GHz including HI.

**G341.2+0.9**

**RA:** 16<sup>h</sup>47<sup>m</sup>35<sup>s</sup>  
**Dec:** –43°47′

**1-GHz flux/Jy:** 1.5?  
**Spectral index:** 0.6?

**Size/arcmin:** 22 × 16  
**Type:** C

**Radio:** Incomplete shell, with extension to SW.

**Point sources:** Pulsar in W, with wind nebula.

**References:**

Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz (54″ × 116″ :  $S = 3.0 \pm 0.1$  Jy) and 1.4 GHz (21″ × 25″ :  $S = 12.5 \pm 0.05$  Jy).  
 Giacani *et al.* 2001, AJ, 121, 3133. VLA at 1.4 and 4.9 GHz (25″) of pulsar wind nebula.

**G341.9–0.3**

**RA:** 16<sup>h</sup>55<sup>m</sup>01<sup>s</sup>  
**Dec:** –44°01′

**1-GHz flux/Jy:** 2.5  
**Spectral index:** 0.5

**Size/arcmin:** 7  
**Type:** S

**Radio:** Incomplete shell, brightest to NE.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S = 7.4$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 1.7$  Jy).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50′), revision of previous flux densities.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (35″ × 11″ :  $S = 2.2 \pm 0.1$  Jy).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″ :  $S = 2.7$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.

**G342.0–0.2**

**RA:** 16<sup>h</sup>54<sup>m</sup>50<sup>s</sup>  
**Dec:** –43°53′

**1-GHz flux/Jy:** 3.5?  
**Spectral index:** 0.4?

**Size/arcmin:** 12 × 9  
**Type:** S

**Radio:** Distorted shell.

**References:**

Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50′), estimate  $S_{408 \text{ MHz}} = 5$  Jy,  $S_{5 \text{ GHz}} = 2$  Jy from previous maps.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (35″ × 11″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 62″ :  $S = 3.5$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.

**G342.1+0.9**

**RA:** 16<sup>h</sup>50<sup>m</sup>43<sup>s</sup>  
**Dec:** –43°04′

**1-GHz flux/Jy:** 0.5?  
**Spectral index:** ?

**Size/arcmin:** 10×9  
**Type:** S

**Radio:** Incomplete shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×63″;  $S=0.6$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G343.0–6.0**

**RA:** 17<sup>h</sup>25<sup>m</sup>00<sup>s</sup>  
**Dec:** –46°30′

**1-GHz flux/Jy:** ?  
**Spectral index:** ?

**RCW 114**  
**Size/arcmin:** 250  
**Type:** S

**Radio:** Faint, poorly defined.

**Optical:** Filamentary shell.

**References:**

Walker & Zealey 2001, MNRAS, 325, 287. Optical observations, and review of earlier observations.  
 Welsh *et al.* 2003, A&A, 403, 605. Optical spectroscopy.

Casandjian & Grenier 2008, A&A, 489, 849.  $\gamma$ -ray observations.  
 Kim *et al.* 2010, ApJ, 709, 823. UV observations.

**G343.1–2.3**

**RA:** 17<sup>h</sup>08<sup>m</sup>00<sup>s</sup>  
**Dec:** –44°16′

**1-GHz flux/Jy:** 8?  
**Spectral index:** 0.5?

**Size/arcmin:** 32?  
**Type:** C?

**Radio:** Incomplete shell?

**X-ray:** Pulsar wind nebula.

**Point sources:** Pulsar near edge, with wind nebula.

**References:**

McAdam *et al.* 1993, Nature, 361, 516. MOST at 843 MHz (smoothed to 2′).  
 Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz (56″×111″;  $S=10.6$  Jy) and 1.4 GHz (22″×27″) near pulsar.  
 Becker *et al.* 1995, A&A, 298, 528. ROSAT of pulsar, and limit for remnant.  
 Giacani *et al.* 2001, AJ, 121, 3133. VLA at 1.4, 4.9 and

8.5 GHz (25″) of pulsar wind nebula.  
 Gotthelf *et al.* 2002, ApJ, 567, L125. Pulsar x-ray detection.  
 Dodson & Golap 2002, MNRAS, 334, L1. ATCA at 1.4 GHz (70″×47″) including polarisation, and Chandra observations of pulsar wind nebula.  
 Aharonian *et al.* 2005, A&A, 432, L9.  $\gamma$ -ray limit.  
 Abramowski *et al.* 2011, A&A, 528, A143.  $\gamma$ -ray observations.

**G343.1–0.7**

**RA:** 17<sup>h</sup>00<sup>m</sup>25<sup>s</sup>  
**Dec:** –43°14′

**1-GHz flux/Jy:** 7.8  
**Spectral index:** 0.55

**Size/arcmin:** 27×21  
**Type:** S

**Radio:** Shell, with smaller thermal shell adjacent.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×63″;  $S=8.5\pm 0.6$ ), plus Parkes 64-m at 4.5 GHz ( $S=3.9\pm 0.6$  Jy) and 8.55 GHz ( $S=2.4\pm 0.5$  Jy)  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.

**G344.7–0.1**

**RA:** 17<sup>h</sup>03<sup>m</sup>51<sup>s</sup>  
**Dec:** –41°42′

**1-GHz flux/Jy:** 2.5?  
**Spectral index:** 0.3?

**Size/arcmin:** 8  
**Type:** C?

**Radio:** Asymmetric shell, with possible core.

**X-ray:** Detected.

**Distance:** HI absorption and association with features suggests 6.3 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:  $S=4.7$  Jy) and Parkes 64-m at 5 GHz (4′:  $S=1.3$  Jy).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (30″×43″:  $S=1.7\pm 0.1$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×65″:  $S=2.5$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observa-

tions.  
 Yamauchi *et al.* 2005, PASJ, 57, 459. ASCA observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Giacani *et al.* 2011, A&A, 531, A138. VLA and ATCA at 1.4 GHz (5″6×8″), ATCA at 5 GHz (10″×13″) and 8.4 GHz (5″×10″), plus XMM observations and HI from SGPS.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Yamaguchi *et al.* 2012, ApJ, 749, 137. Suzaku observations.  
 Yang *et al.* 2013, ApJ, 766, 44. Suzaku spectroscopy.

**G345.7–0.2**

**RA:** 17<sup>h</sup>07<sup>m</sup>20<sup>s</sup>  
**Dec:** –40°53′

**1-GHz flux/Jy:** 0.6?  
**Spectral index:** ?

**Size/arcmin:** 6  
**Type:** S

**Radio:** Poorly defined diffuse shell.

**Point sources:** Old pulsar nearby.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×66″:  $S=0.7$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G346.6–0.2**

**RA:** 17<sup>h</sup>10<sup>m</sup>19<sup>s</sup>  
**Dec:** –40°11′

**1-GHz flux/Jy:** 8?  
**Spectral index:** 0.5?

**Size/arcmin:** 8  
**Type:** S

**Radio:** Irregular shell.

**X-ray:** Centrally brightened.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:  $S=14.9$  Jy) and Parkes 64-m at 5 GHz (4′:  $S=4.3$  Jy).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (31″×43″:  $S=8.1\pm 0.9$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″×67″:  $S=8.7$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

Koralesky *et al.* 1998, AJ, 116, 1323. VLA detection of compact OH emission.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Sezer *et al.* 2011, MNRAS, 415, 301. Suzaku observations.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Yamauchi *et al.* 2013, PASJ, 65, 6. Suzaku observations.



**G347.3–0.5**

**RA:** 17<sup>h</sup>13<sup>m</sup>50<sup>s</sup>  
**Dec:** –39°45′

**1-GHz flux/Jy:** 30?  
**Spectral index:** ?

RX J1713.7–3946

**Size/arcmin:** 65×55  
**Type:** S?

**Radio:** Faint emission.

**X-ray:** Non-thermal, limb-brightened to W, with central source.

**Point sources:** Central X-ray source.

**Distance:** Association with molecular clouds and X-ray observations imply 1.3 kpc.

**References:**

Koyama *et al.* 1997, PASJ, 49, L7. ASCA of NW.  
 Slane *et al.* 1999, ApJ, 525, 357. ASCA and other observations.  
 Muraishi *et al.* 2000, A&A, 354, L57. High energy  $\gamma$ -ray detection.  
 Butt *et al.* 2001, ApJ, 562, L167. Associated  $\gamma$ -ray emission.  
 Ellison *et al.* 2001, ApJ, 563, 191. ATCA at 1.4 GHz (46''×36''), and ASCA observations.  
 Enomoto *et al.* 2002, Nature, 416, 823.  $\gamma$ -ray observations.  
 Uchiyama *et al.* 2002, PASJ, 54, L73. ASCA observations.  
 Uchiyama *et al.* 2003, A&A, 400, 567. Chandra spectroscopy.  
 Pannuti *et al.* 2003, ApJ, 593, 377. ROSAT and ASCA observations.  
 Lazendic *et al.* 2003, ApJ, 593, L27. Chandra, XMM and other X-ray observations of central source.  
 Fukui *et al.* 2003, PASJ, 55, L61. CO observations of surroundings.  
 Cassam-Chenaï *et al.* 2004, A&A, 427, 199. XMM and other observations.  
 Aharonian *et al.* 2004, Nature, 432, 75.  $\gamma$ -ray detection.  
 Lazendic *et al.* 2004, ApJ, 602, 271. Chandra observations of parts, and ATCA at 1.4 GHz (36''×46'').

Hiraga *et al.* 2005, A&A, 431, 953. XMM observations,  
 Moriguchi *et al.* 2005, ApJ, 631, 947. CO observations of surroundings.  
 Aharonian *et al.* 2007, A&A, 464, 235.  $\gamma$ -ray observations.  
*see also:* Aharonian *et al.* 2011, A&A, 531, C1. Erratum.  
 Uchiyama *et al.* 2007, Nature, 449, 576. Chandra multi-epoch observations for study of small-scale variability.  
 Tanaka *et al.* 2008, ApJ, 685, 988. Suzaku observations.  
 Takahashi *et al.* 2008, PASJ, 60, S131. Suzaku observations of SW.  
 Mignani *et al.* 2008, A&A, 484, 457. Optical and IR observations of central source.  
 Acero *et al.* 2009, A&A, 505, 157. XMM observations, plus other radio, IR and  $\gamma$ -ray data.  
 Sano *et al.* 2010, ApJ, 724, 59. CO observations of region.  
 Maxted *et al.* 2012, MNRAS, 422, 2230. Molecular line observations.  
*see also:* Maxted *et al.* 2013, MNRAS, 430, 2511. Erratum.  
 Sano *et al.* 2013, ApJ, 778, 59. CO, SGPS HI and Suzaku observations.

**G348.5–0.0**

**RA:** 17<sup>h</sup>15<sup>m</sup>26<sup>s</sup>  
**Dec:** –38°28′

**1-GHz flux/Jy:** 10?  
**Spectral index:** 0.4?

**Size/arcmin:** 10?  
**Type:** S?

**Radio:** Arc, overlapping G348.5+0.1.

**References:**

Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46''×53''), 1.4 GHz (18''×33'') and part at 5 GHz (2''5×3''9).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43''×69'' : S=10.2 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G348.5+0.1**

**RA:** 17<sup>h</sup>14<sup>m</sup>06<sup>s</sup>  
**Dec:** –38°32′

**1-GHz flux/Jy:** 72  
**Spectral index:** 0.3

CTB 37A

**Size/arcmin:** 15  
**Type:** S

**Radio:** Shell, poorly define to S and W, overlapping G348.5–0.0 in E.

**X-ray:** Brighter to W.

**Distance:** HI absorption indicates 8.0 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : S = 97 Jy).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4 : S = 43 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz (0.8 : S > 50) and Parkes 64-m at 14.7 GHz (2.2 : S = 18 ± 5 Jy).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20″ × 45″).  
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46″ × 53″), 1.4 GHz (18″ × 33″) and part at 5 GHz (2″.5 × 3″.9).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz

(43″ × 69″ : S = 71 Jy).  
 Brogan *et al.* 2000, ApJ, 537, 875. VLA at 1.7 GHz for OH Zeeman splitting.  
 Reynoso & Mangum 2000, ApJ, 545, 874. CO observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Aharonian *et al.* 2008, A&A, 490, 685.  $\gamma$ -ray observations.  
 Castro & Slane 2010, ApJ, 717, 372. Fermi observations.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.  
 Sezer *et al.* 2011, MNRAS, 417, 1387. Suzaku observations.  
 Tian & Leahy 2012, MNRAS, 421, 2593. SGPS HI absorption observations.  
 Maxted *et al.* 2013, MNRAS, 434, 2188. Molecular line observations of region.

**G348.7+0.3**

**RA:** 17<sup>h</sup>13<sup>m</sup>55<sup>s</sup>  
**Dec:** –38°11′

**1-GHz flux/Jy:** 26  
**Spectral index:** 0.3

CTB 37B

**Size/arcmin:** 17?  
**Type:** S

**Radio:** Incomplete shell with faint eastern extensions.

**X-ray:** Diffuse emission.

**Point sources:** X-ray pulsar.

**Distance:** HI absorption suggests 13 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : S = 34 Jy).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4 : S = 32 Jy).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz (0.8 : S > 20) and Parkes 64-m at 14.7 GHz (2.2 : S = 8 ± 3 Jy).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20″ × 45″).  
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46″ × 53″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 69″ : S = 33 Jy).

Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Aharonian *et al.* 2006, ApJ, 636, 777.  $\gamma$ -ray detection.  
 Aharonian *et al.* 2008, A&A, 486, 829.  $\gamma$ -ray and Chandra observations.  
 Nakamura *et al.* 2009, PASJ, 61, S197. Suzaku and Chandra observations.  
 Halpern & Gotthelf 2010, ApJ, 710, 941. Chandra detection of pulsar.  
 Halpern & Gotthelf 2010, ApJ, 725, 1384. Chandra observations of pulsar.  
 Tian & Leahy 2012, MNRAS, 421, 2593. SGPS HI observations.

**G349.2–0.1**

**RA:** 17<sup>h</sup>17<sup>m</sup>15<sup>s</sup>  
**Dec:** –38°04′

**1-GHz flux/Jy:** 1.4?  
**Spectral index:** ?

**Size/arcmin:** 9 × 6  
**Type:** S

**Radio:** Elongated shell, adjacent to bright HII region.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 70″ : S = 1.6 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G349.7+0.2**

**RA:** 17<sup>h</sup>17<sup>m</sup>59<sup>s</sup>  
**Dec:** –37°26′

**1-GHz flux/Jy:** 20  
**Spectral index:** 0.5

**Size/arcmin:** 2.5×2  
**Type:** S

**Radio:** Incomplete clumpy shell, with enhancement to the S.

**X-ray:** Irregular shell, brighter to S and E.

**Distance:** H I absorption indicates 14.8 kpc, association with OH features gives 22 kpc.

**References:**

Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : S = 31.0 Jy) and Parkes 64-m at 5 GHz (4′ : S = 9.1 Jy), no maps.  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H I absorption.  
 Shaver *et al.* 1985, Nature, 313, 113. VLA at 1.4 GHz (3′.4×14′.5).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×71′ : S = 22 Jy).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Brogan *et al.* 2000, ApJ, 537, 875. VLA at 1.7 GHz for OH Zeeman splitting.  
 Reynoso & Mangum 2001, AJ, 121, 347. CO observations of the vicinity.

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Slane *et al.* 2002, ApJ, 580, 904. ASCA observations.  
 Dubner *et al.* 2004, A&A, 426, 201. CO observations of surroundings.  
 Lazendic *et al.* 2005, ApJ, 618, 733. Chandra observations.  
 Reach *et al.* 2006, AJ, 131, 1479. Spitzer observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Hewitt *et al.* 2009, ApJ, 694, 1266. Spitzer spectroscopy.  
 Castro & Slane 2010, ApJ, 717, 372. Fermi observations.  
 Lazendic *et al.* 2010, MNRAS, 409, 371. OH, CO and other molecular line observations of region.  
 Anderson *et al.* 2011, ApJ, 742, 7. Spitzer observations.

**G350.0–2.0**

**RA:** 17<sup>h</sup>27<sup>m</sup>50<sup>s</sup>  
**Dec:** –38°32′

**1-GHz flux/Jy:** 26  
**Spectral index:** 0.4

**Size/arcmin:** 45  
**Type:** S

Incorporates the previously catalogued G350.0–1.8 in the NW.

**Radio:** Shell, brightest in NW.

**Optical:** Detected.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 49.5 Jy) and Parkes 64-m at 5 GHz (4′ : S = 13.6 Jy).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4.4).

Gaensler 1998, ApJ, 493, 781. VLA and Parkes 64-m at 1.4 GHz (18′×21′ : S = 22.3±0.3 Jy), clarifying extent of remnant.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.

**G350.1–0.3**

**RA:** 17<sup>h</sup>17<sup>m</sup>40<sup>s</sup>  
**Dec:** –37°24′

**1-GHz flux/Jy:** 6?  
**Spectral index:** 0.8?

**Size/arcmin:** 4?  
**Type:** ?

**Radio:** Several clumps of emission.

**X-ray:** Diffuse emission, with compact source.

**Point sources:** X-ray source.

**Distance:** H I absorption indicates 4.5 to 10.7 kpc, possible interaction with molecular cloud indicates 4.5 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 10.7) and Parkes 64-m at 5 GHz (4′ : S = 1.7).  
 Salter *et al.* 1986, A&A, 162, 217. VLA at 1.5 (4′×10′.4) and 4.8 GHz (15′×35′) and 15 GHz (5′×2′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43′×71′)..

Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA observations.  
 Gaensler *et al.* 2008, ApJ, 680, L37. VLA at 4.8 GHz (11′.4×5′.6) plus XMM observations.  
 Lovchinsky *et al.* 2011, ApJ, 731, 70. Chandra and Spitzer observations.

**G351.2+0.1**

**RA:** 17<sup>h</sup>22<sup>m</sup>27<sup>s</sup>  
**Dec:** –36°11′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.4

**Size/arcmin:** 7  
**Type:** C?

Has been called G351.3+0.2.

**Radio:** Distorted shell, with possible flat-spectrum core.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 8.1$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 3.1$  Jy).  
 Becker & Helfand 1988, AJ, 95, 883. VLA at 5 GHz (15″), and at 15 GHz of core.  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz

(32″ × 36″ :  $S = 4.8 \pm 0.2$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 73″ :  $S = 5.5$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G351.7+0.8**

**RA:** 17<sup>h</sup>21<sup>m</sup>00<sup>s</sup>  
**Dec:** –35°27′

**1-GHz flux/Jy:** 10  
**Spectral index:** 0.5?

**Size/arcmin:** 18 × 14  
**Type:** S

**Radio:** Elongated shell, adjacent to bright HII region.

**Point sources:** Pulsar nearby.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 74″ :  $S = 11$  Jy).  
 Tian *et al.* 2007, MNRAS, 378, 1283. SGPS at 1.4 GHz (100″ :  $S = 8.4 \pm 0.7$  Jy) including HI.

**G351.9–0.9**

**RA:** 17<sup>h</sup>28<sup>m</sup>52<sup>s</sup>  
**Dec:** –36°16′

**1-GHz flux/Jy:** 1.8?  
**Spectral index:** ?

**Size/arcmin:** 12 × 9  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 73″ :  $S = 2.0$  Jy).

**G352.7–0.1**

**RA:** 17<sup>h</sup>27<sup>m</sup>40<sup>s</sup>  
**Dec:** –35°07′

**1-GHz flux/Jy:** 4  
**Spectral index:** 0.6

**Size/arcmin:** 8 × 6  
**Type:** S

**Radio:** Distorted shell.

**X-ray:** Detected.

**Distance:** HI absorption indicates 6.8 to 8.4 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 9.6$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S = 2.3$  Jy).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (1.1).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (34″ :  $S = 3.4 \pm 0.4$  Jy).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 75″ :  $S = 4.4$  Jy).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Kinugasa *et al.* 1998, PASJ, 50, 249. ASCA observations.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observations.  
 Giacani *et al.* 2009, A&A, 507, 841. VLA at 4.8 GHz (9″ × 12″), plus HI and XMM observations.

**G353.6–0.7**

**RA:** 17<sup>h</sup>32<sup>m</sup>00<sup>s</sup>  
**Dec:** –34°44′

**1-GHz flux/Jy:** 2.5?  
**Spectral index:** ?

**Size/arcmin:** 30  
**Type:** S

**Radio:** Shell, brighter to S.

**X-ray:** Detected.

**Point sources:** Central X-ray source.

**References:**

Tian *et al.* 2008, ApJ, 679, L85. SGPS at 1.4 GHz (100''), plus 843 MHz (43'') and X-ray observations.  
 Tian *et al.* 2010, ApJ, 712, 790. XMM, Suzaku and CO observations.  
 Halpern & Gotthelf 2010, ApJ, 710, 941. XMM observations.

Abramowski *et al.* 2011, A&A, 531, A81.  $\gamma$ -ray observations.  
 Bamba *et al.* 2012, ApJ, 756, 149. Suzaku observations.  
 see also: Bamba *et al.* 2012, ApJ, 761, 80. Erratum.  
 Klochkov *et al.* 2013, A&A, 556, A41. XMM and other X-ray observations.

**G353.9–2.0**

**RA:** 17<sup>h</sup>38<sup>m</sup>55<sup>s</sup>  
**Dec:** –35°11′

**1-GHz flux/Jy:** 1?  
**Spectral index:** 0.5?

**Size/arcmin:** 13  
**Type:** S

**Radio:** Shell, with central double source.

**References:**

Green 2001, MNRAS, 326, 283. VLA at 327 MHz (3'0×2'7) and 1.4 GHz (42''×36''), plus 8.4 GHz (8'4×6'1) of central source only.

**G354.1+0.1**

**RA:** 17<sup>h</sup>30<sup>m</sup>28<sup>s</sup>  
**Dec:** –33°46′

**1-GHz flux/Jy:** ?  
**Spectral index:** varies

**Size/arcmin:** 15×3?  
**Type:** C?

Is this a SNR?

**Radio:** Elongated N–S.

**Point sources:** Pulsar at S tip.

**References:**

Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz (47''×99'') and 1.4 GHz (8''8×21'').

**G354.8–0.8**

**RA:** 17<sup>h</sup>36<sup>m</sup>00<sup>s</sup>  
**Dec:** –33°42′

**1-GHz flux/Jy:** 2.8?  
**Spectral index:** ?

**Size/arcmin:** 19  
**Type:** S

**Radio:** Distorted shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43''×78'') : S=3.1 Jy.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-

tions.  
 Koralesky *et al.* 1998, AJ, 116, 1323. VLA search for OH emission.

**G355.4+0.7**

**RA:** 17<sup>h</sup>31<sup>m</sup>20<sup>s</sup>  
**Dec:** –32°26′

**1-GHz flux/Jy:** 5?  
**Spectral index:** ?

**Size/arcmin:** 25  
**Type:** S

**Radio:** Faint, incomplete shell.

**References:**

Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43''×77'').  
 Roy & Bhatnagar 2006, JPhCS, 54, 152. GMRT at 330 MHz (1' : S=8.9±1.3 Jy).

**G355.6–0.0**

**RA:** 17<sup>h</sup>35<sup>m</sup>16<sup>s</sup>  
**Dec:** –32°38′

**1-GHz flux/Jy:** 3?  
**Spectral index:** ?

**Size/arcmin:** 8×6  
**Type:** S

**Radio:** Well defined shell.

**X-ray:** Centrally brightened.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×80″ :  
 $S=2.6$  Jy).  
 Sugizaki *et al.* 2001, ApJS, 134, 77. ASCA survey observa-  
 tions.  
 Roy & Bhatnagar 2006, JPhCS, 54, 152. GMRT at 330 MHz

(1′ :  $S=3.3\pm 0.5$  Jy).  
 Marquez-Lopez & Phillips 2010, MNRAS, 407, 94. Mid-IR ob-  
 servations.  
 Minami *et al.* 2013, PASJ, 65, 99. Suzaku observations.

**G355.9–2.5**

**RA:** 17<sup>h</sup>45<sup>m</sup>53<sup>s</sup>  
**Dec:** –33°43′

**1-GHz flux/Jy:** 8  
**Spectral index:** 0.5

**Size/arcmin:** 13  
**Type:** S

**Radio:** Distorted shell, brightest to SE.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=$   
 $12.3$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S=3.4$  Jy).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz  
 (32″×34″ :  $S=5.0\pm 0.3$  Jy).  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×77″).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observa-  
 tions.  
 Marquez-Lopez & Phillips 2010, MNRAS, 407, 94. Mid-IR ob-  
 servations.

**G356.2+4.5**

**RA:** 17<sup>h</sup>19<sup>m</sup>00<sup>s</sup>  
**Dec:** –29°40′

**1-GHz flux/Jy:** 4  
**Spectral index:** 0.7

**Size/arcmin:** 25  
**Type:** S

Has been called G356.2+4.4.

**Radio:** Faint shell.

**References:**

Duncan *et al.* 1995, MNRAS, 277, 36. Parkes 64-m at 2.4-GHz  
 (10′.4).  
 Bhatnagar 2000, MNRAS, 317, 453. GMRT at 327 MHz  
 (3′×1′.5 :  $S=8.1\pm 1.7$  Jy), and NVSS at 1.4 GHz.

**G356.3–1.5**

**RA:** 17<sup>h</sup>42<sup>m</sup>35<sup>s</sup>  
**Dec:** –32°52′

**1-GHz flux/Jy:** 3?  
**Spectral index:** ?

**Size/arcmin:** 20×15  
**Type:** S

**Radio:** Double arc.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×79″ :  
 $S=2.8$  Jy).  
 Bhatnagar 2002, MNRAS, 332, 1. GMRT at 327 MHz  
 (0′.8×1′.7 :  $S=5.7\pm 0.2$ ).

**G356.3–0.3**

**RA:** 17<sup>h</sup>37<sup>m</sup>56<sup>s</sup>  
**Dec:** –32°16′

**1-GHz flux/Jy:** 3?  
**Spectral index:** ?

**Size/arcmin:** 11×7  
**Type:** S

Has been suggested this part of a larger SNR.

**Radio:** Diffuse emission.

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×81″ :  
 $S=2.6$  Jy).  
 Roy & Pramesh Rao 2002, MNRAS, 329, 775. GMRT at  
 330 MHz (2′7×4′8).

**G357.7–0.1**

**RA:** 17<sup>h</sup>40<sup>m</sup>29<sup>s</sup>  
**Dec:** –30°58′

**1-GHz flux/Jy:** 37  
**Spectral index:** 0.4

MSH 17–39

**Size/arcmin:** 8×3?  
**Type:** ?

Has been suggested that this is not a SNR.

**Radio:** Multiple arcs and filaments, brighter to NW ‘head’.

**X-ray:** Detected from NW ‘head’, and SW ‘tail’.

**Distance:** H<sub>I</sub> absorption suggests beyond Galactic Centre.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  
 $S=54.2$  Jy) and Parkes 64-m at 5 GHz (4′ :  $S=18.5$  Jy).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz  
 (4′4 :  $S=14.6$  Jy).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at  
 4.9 GHz (2′6).  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz  
 (50″).  
 Weiler & Panagia 1980, A&A, 90, 269. Effelsberg 100-m at  
 9 GHz (1′5) (private communication from Baker).  
 Shaver *et al.* 1985, Nature, 313, 113. VLA at 1.4 GHz  
 (3″8×10″9) and 5 GHz (12″×26″).  
 Becker & Helfand 1985, Nature, 313, 115. VLA at 1.4 GHz  
 and 5 GHz.  
 Helfand & Becker 1985, Nature, 313, 118. Suggest it is not a  
 SNR.  
 Shaver *et al.* 1985, A&A, 147, L23. Observations of peripheral  
 compact source.  
 Caswell *et al.* 1989, PASA, 8, 184. MOST at 843 MHz  
 (43″×83″).  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×84″).  
 Stewart *et al.* 1994, ApJ, 432, L39. ATCA at 4.79 and 5.84 GHz  
 (12″×22″) and Effelsberg 100-m at 10.6 GHz (1′), including  
 polarisation.  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant,

including masers.  
 Yusef-Zadeh *et al.* 1999, ApJ, 527, 172. VLA of nearby OH  
 masers.  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz  
 (43″×24″).  
 Brogan *et al.* 2000, ApJ, 537, 875. VLA at 1.7 GHz for OH  
 Zeeman splitting.  
 Brogan & Goss 2003, AJ, 125, 272. VLA at 1.4 GHz  
 (13″6×11″4), including H<sub>I</sub>, and 8.3 GHz (14″3×6″8) recom-  
 bination line observation of H<sub>II</sub> region.  
 Gaensler *et al.* 2003, ApJ, 594, L35. Chandra detection.  
 Lazendic *et al.* 2003, AN, 324 (No S1), 157. Molecular line  
 observations.  
 Burton *et al.* 2004, MNRAS, 348, 638. IR and radio observa-  
 tions of H<sub>II</sub> region.  
 Lazendic *et al.* 2004, MNRAS, 354, 393. IR and molecular line  
 observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for  
 OH masers.  
 Phillips *et al.* 2009, MNRAS, 397, 1215. Observations of inter-  
 actions with surroundings.  
 Castro *et al.* 2013, ApJ, 774, 36. Fermi observations.

**G357.7+0.3**

**RA:** 17<sup>h</sup>38<sup>m</sup>35<sup>s</sup>  
**Dec:** –30°44′

**1-GHz flux/Jy:** 10  
**Spectral index:** 0.4?

**Size/arcmin:** 24  
**Type:** S

**Radio:** Non-thermal shell in complex region.

**References:**

Reich & Fürst 1984, A&AS, 57, 165. Effelsberg 100-m at  
 2.7 GHz (4′3 :  $S=7\pm 1.5$  Jy),  $S_{5\text{ GHz}}=5.5\pm 1.5$  Jy from sur-  
 veys.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×84″).  
 Yusef-Zadeh *et al.* 1999, ApJ, 527, 172. VLA of nearby OH

masers.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for  
 OH masers.  
 Phillips & Marquez-Lugo 2010, MNRAS, 409, 701. Spitzer ob-  
 servations of region.

**G358.0+3.8**

**RA:** 17<sup>h</sup>26<sup>m</sup>00<sup>s</sup>  
**Dec:** –28°36′

**1-GHz flux/Jy:** 1.5?  
**Spectral index:** ?

**Size/arcmin:** 38  
**Type:** S

**Radio:** Faint shell.

**References:**

Duncan *et al.* 1995, MNRAS, 277, 36. Parkes 64-m at 2.4-GHz (10′.4).  
 Bhatnagar 2000, MNRAS, 317, 453. GMRT at 327 MHz (2′.2×1′.3: S=2.5±1.3 Jy), and NVSS at 1.4 GHz.

**G358.1+0.1**

**RA:** 17<sup>h</sup>37<sup>m</sup>00<sup>s</sup>  
**Dec:** –29°59′

**1-GHz flux/Jy:** 2?  
**Spectral index:** ?

**Size/arcmin:** 20  
**Type:** S

**Radio:** Faint shell.

**References:**

Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×77″).  
 Roy & Bhatnagar 2006, JPhCS, 54, 152. GMRT at 330 MHz (1′: S=6.0±2.5 Jy).

**G358.5–0.9**

**RA:** 17<sup>h</sup>46<sup>m</sup>10<sup>s</sup>  
**Dec:** –30°40′

**1-GHz flux/Jy:** 4?  
**Spectral index:** ?

**Size/arcmin:** 17  
**Type:** S

**Radio:** Shell, brighter to NE.

**References:**

Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×77″).  
 Roy & Bhatnagar 2006, JPhCS, 54, 152. GMRT at 330 MHz (1′: S=8.0±2.5 Jy).

**G359.0–0.9**

**RA:** 17<sup>h</sup>46<sup>m</sup>50<sup>s</sup>  
**Dec:** –30°16′

**1-GHz flux/Jy:** 23  
**Spectral index:** 0.5

**Size/arcmin:** 23  
**Type:** S

**Radio:** Incomplete shell.

**Optical:** Detected.

**X-ray:** Partial shell.

**References:**

Reich *et al.* 1988, IAUCo, 101, 293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×86″).  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz (43″×24″).

Bamba *et al.* 2000, PASJ, 52, 259. ASCA observations.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (8′.4×12′.8) of part.  
 Bamba *et al.* 2009, ApJ, 691, 1854. Suzaku observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.



**G359.1–0.5****RA:** 17<sup>h</sup>45<sup>m</sup>30<sup>s</sup>  
**Dec:** –29°57′**1-GHz flux/Jy:** 14  
**Spectral index:** 0.4?**Size/arcmin:** 24  
**Type:** S**Radio:** Non-thermal shell in complex region, crossed by the ‘snake’.**Optical:** Detected.**X-ray:** Centrally brightened.**Point sources:** Several compact radio sources near centre, OH masers around edge.**References:**

Downes *et al.* 1979, A&AS, 35, 1. From observations by Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′6″:  $S=13$  Jy).  
 Reich & Fürst 1984, A&AS, 57, 165. Effelsberg 100-m at 2.7 GHz (4′3″ :  $S = 10 \pm 1.5$  Jy) and 4.8 GHz (2′4″ :  $S = 8.1 \pm 0.5$  Jy).  
 Uchida *et al.* 1992, ApJ, 398, 128. VLA at 1.5 GHz (11″×10″), and observations of nearby molecular material.  
 Uchida *et al.* 1992, AJ, 104, 1533. VLA at 1.4 GHz.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43″×85″).  
 Yusef-Zadeh *et al.* 1995, Science, 270, 1801. VLA at 1.4 GHz (33″×31″), and 1.7 GHz for OH survey.  
 LaRosa *et al.* 2000, AJ, 119, 207. VLA at 333 MHz (43″×24″).

Bamba *et al.* 2000, PASJ, 52, 259. ASCA observations.  
 Lazendic *et al.* 2002, MNRAS, 331, 537. Observations of shocked molecular gas where the ‘snake’ crosses the remnant.  
 Yusef-Zadeh *et al.* 2004, ApJS, 155, 421. VLA at 1.4 GHz (8″4×12″8).  
 Aharonian *et al.* 2008, A&A, 483, 509. XMM and  $\gamma$ -ray observations.  
 Hewitt *et al.* 2008, ApJ, 683, 189. GBT at 1.6 and 1.7 GHz for OH masers.  
 Bamba *et al.* 2009, ApJ, 691, 1854. Suzaku observations.  
 Stupar & Parker 2011, MNRAS, 414, 2282. H $\alpha$  observations.  
 Ohnishi *et al.* 2011, PASJ, 63, 527. Suzaku observations.

**G359.1+0.0****RA:** 17<sup>h</sup>39<sup>m</sup>36<sup>s</sup>  
**Dec:** –29°11′**1-GHz flux/Jy:** ??  
**Spectral index:** ?**Size/arcmin:** 12×11  
**Type:** S**Radio:** Shell, brightest in E.**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″×88″ :  $S=4.3$  Jy).  
 Roy & Bhatnagar 2006, JPhCS, 54, 152. GMRT at 330 MHz

(1′ :  $S=4.3 \pm 1.0$  Jy).  
 Law *et al.* 2008, ApJS, 177, 515. VLA at 1.4 GHz (10″9×15″9 :  $S=1.3 \pm 0.5$  Jy).