

G0.0 + 0.0

Sgr A East

RA: 17^h42^m33^s**1-GHz flux/Jy:** 100?**Size/arcmin:** 3.5 × 2.5**Dec:** -28°59'**Spectral index:** 0.8?**Type:** S**Radio:** Non-thermal shell, in complex region, interacting with molecular material to the west.**References:**

Ekers *et al.* 1983, A&A, 122, 143. VLA at 1.4 GHz and 5 GHz (both 5'' × 8''), $S(1.4) = 77$, $S(5.0) = 31$.
 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, Nat, 350, 309. VLA of NH₃ 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 H₂O masers.

G0.9 + 0.1**RA:** 17^h44^m12^s**1-GHz flux/Jy:** 18?**Size/arcmin:** 8**Dec:** -28°08'**Spectral index:** varies**Type:** C**Radio:** Flat spectrum core within steep spectrum shell.**X-ray:** Possibly detected.**References:**

Helfand & Becker 1987, ApJ, 314, 203. VLA at 1.4 and 5 GHz, and IPC observations.
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 91'').

G1.0 - 0.1**RA:** 17^h46^m20^s**1-GHz flux/Jy:** 15?**Size/arcmin:** 8**Dec:** -28°25'**Spectral index:** 0.6?**Type:** S

Has been called G1.05-0.1.

Radio: Incomplete shell, to the S of Sgr D.**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'' : $S = 12.3$).
 Liszt 1992, ApJS, 82, 495. VLA at 1.6 GHz (13'' × 23'').
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 91'').

G1.4 - 0.1**RA:** 17^h46^m30^s**1-GHz flux/Jy:** 2?**Size/arcmin:** 10**Dec:** -27°45'**Spectral index:** ?**Type:** S**Radio:** Shell, brightest in E.**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43'' × 92'' : $S = 2$).

G1.9 + 0.3**RA:** 17^h45^m37^s**1-GHz flux/Jy:** 0.6**Size/arcmin:** 1.2**Dec:** -27°09'**Spectral index:** 0.7**Type:** S**Radio:** Shell, brighter to the N.**References:**

Green & Gull 1984, Nat, 312, 527. VLA at 5 GHz (4'' × 2'').
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 94'').

G3.7 - 0.2

RA: 17^h52^m20^s
Dec: -25°50'

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

Size/arcmin: 11 × 14
Type: S

Radio: Double arc.

References:

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43'' × 99'' : $S = 2.4$).

G3.8 + 0.3

RA: 17^h49^m50^s
Dec: -25°27'

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

Size/arcmin: 18
Type: S?

Radio: Incomplete shell.

References:

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43'' × 100'' : $S = 3.5$).

G4.2 - 3.5

RA: 18^h05^m45^s
Dec: -27°04'

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

Size/arcmin: 28
Type: S

Radio: Elongated shell.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G4.5 + 6.8

RA: 17^h27^m42^s
Dec: -21°27'

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: Historical observations indicate about 4.4 kpc.

References:

van den Bergh & Kamper 1977, ApJ, 218, 617. Optical proper motions.

Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.

Danziger & Goss 1980, MNRAS, 190, 47P. Revision of distance.

White & Long 1983, ApJ, 264, 196. IPC observations.

Matsui *et al.* 1984, ApJ, 287, 295. VLA at 1.4 (2''.5 × 3''.2) and 5 GHz (3''.2 × 4''.8) and HRI map (5'').

Dickel *et al.* 1988, ApJ, 330, 254. VLA at 1.4 (1''.2 × 2''.3) and 5 GHz (0''.6 × 1''.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.

G5.2 - 2.6

RA: 18^h04^m25^s
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, in SNRISM, p293. Summary of parameters.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G5.4 - 1.2

Milne 56

RA: 17^h59^m00^s**1-GHz flux/Jy:** 35?**Size/arcmin:** 35**Dec:** -24° 55'**Spectral index:** 0.2?**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.

Distance: HI absorption suggests > 4.3 kpc.

Point sources: Pulsar associated with flat spectrum source.

References:

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3' : $S = 38$).

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 : $S = 21.9 \pm 2.4$).

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, Nat, 313, 115. VLA at 1.4 and 5 GHz. Suggest it is not SNR, see Helfand & Becker 1985, Nat, 313, 118.

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, Nat, 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 : $S = 30.8 \pm 2.1$) and 8.4 GHz (3' : $S = 24 \pm 3$), including polarization.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.0 × 4'.9 : $S = 38$).

Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz (68'' × 73''), plus HI absorption.

G5.9 + 3.1**RA:** 17^h44^m20^s**1-GHz flux/Jy:** 3.3?**Size/arcmin:** 20**Dec:** -22° 15'**Spectral index:** 0.4?**Type:** S

Radio: Asymmetric shell.

References:

Reich *et al.* 1988, in SNRISM, p293. Effelsberg 100-m at 2.7 GHz (4'.3).

G6.1 + 1.2**RA:** 17^h51^m55^s**1-GHz flux/Jy:** 4.0?**Size/arcmin:** 30 × 26**Dec:** -23° 05'**Spectral index:** 0.3?**Type:** F

Has been called G6.1+1.15.

Radio: Faint, diffuse emission.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G6.4 – 0.1			W28
RA: 17 ^h 57 ^m 30 ^s	1-GHz flux/Jy: 310	Size/arcmin: 42	
Dec: –23°25′	Spectral index: varies	Type: C	
Has been called G6.6–0.2.			
Radio: Several non-thermal sources in a ring, with flat spectrum core.			
Optical: Filaments.			
X-ray: Diffuse emission from most of the remnant.			
Point sources: Young pulsar near edge of remnant.			
Distance: Uncertain mean optical velocity indicates 3.5–4 kpc.			
References:			
Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10 GHz (3′).			
van den Bergh <i>et al.</i> 1973, ApJS, 26, 19. Optical.			
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 <i>et al.</i> 1977, ApJ, 214, 179. Some optical line ratios.			
Altenhoff <i>et al.</i> 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).			
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.			
Andrews <i>et al.</i> 1983, ApJ, 266, 684. VLA at 1.4 GHz (8′′) 4.9 GHz (3′′) and 15 GHz (1′′) of central region only, plus HRI image of central region.			
Bohigas <i>et al.</i> 1983, RMxAA, 8, 155. Optical spectra.			
Odenwald <i>et al.</i> 1984, ApJ, 279, 162. Nearby IR source.			
Andrews <i>et al.</i> 1985, AJ, 90, 310. VLA of central component.			
Long <i>et al.</i> 1991, ApJ, 373, 567. IPC and optical observations.			
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.1 × 4′.4 : $S = 660$).			
Kaspi <i>et al.</i> 1993, ApJ, 409, L57. Pulsar association.			
Frail <i>et al.</i> 1993, Nat, 365, 136. VLA at 327 MHz (smoothed to 65′′), plus pulsar association.			
Frail <i>et al.</i> 1994, ApJ, 424, L111. VLA of associated OH masers.			
Esposito <i>et al.</i> 1996, ApJ, 461, 820. Possible associated gamma-ray emission.			
Frail <i>et al.</i> 1996, AJ, 111, 1651. OH maser emission.			
<hr/>			
G6.4 + 4.0			
RA: 17 ^h 42 ^m 10 ^s	1-GHz flux/Jy: 1.3?	Size/arcmin: 31	
Dec: –21°20′	Spectral index: 0.4?	Type: S	
Radio: Faint asymmetric shell.			
References:			
Reich <i>et al.</i> 1988, in SNRISM, p293. Effelsberg 100-m at 2.7 GHz (4′.3).			
<hr/>			
G7.7 – 3.7			1814–24
RA: 18 ^h 14 ^m 20 ^s	1-GHz flux/Jy: 11	Size/arcmin: 22	
Dec: –24°05′	Spectral index: 0.32	Type: S	
Radio: Shell, with high polarization.			
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 <i>et al.</i> 1986, MNRAS, 223, 487. MOST at 843 MHz (44′′ × 108′′) and Parkes 64-m at 8.4 GHz (3′ : $S = 4.6 \pm 0.5$), with polarization, plus review of flux densities.			
Dubner <i>et al.</i> 1996, AJ, 111, 1304. VLA at 1.4 GHz (70′′ × 35′′ : $S = 9.9 \pm 0.1$), including polarization.			
<hr/>			
G8.7 – 5.0			
RA: 18 ^h 21 ^m 05 ^s	1-GHz flux/Jy: 4.4	Size/arcmin: 26	
Dec: –23°50′	Spectral index: 0.3	Type: S	
Radio: Asymmetric shell.			
References:			
Reich <i>et al.</i> 1988, in SNRISM, p293. Summary of parameters.			
Reich <i>et al.</i> 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).			

G8.7 – 0.1		(W30)
RA: 18 ^h 02 ^m 35 ^s	1-GHz flux/Jy: 80	Size/arcmin: 45
Dec: –21°25′	Spectral index: 0.5	Type: S?

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 ($7'.2 \times 9'.7$: $S = 190 \pm 50$).
 Kassim & Weiler 1990, Nat, 343, 146. VLA at 327 MHz ($3'.0 \times 3'.7$).
 Kassim & Weiler 1990, ApJ, 360, 184. VLA at 327 MHz ($2'.8 \times 4'.1$: $S = 129 \pm 11$), and part at 1.4 GHz ($0'.9 \times 1'.8$), plus review of flux densities.
 Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz ($37'' \times 55''$).
 Finley & Ögelman 1994, ApJ, 434, L25. ROSAT observations, including pulsar.

G9.8 + 0.6		
RA: 18 ^h 02 ^m 10 ^s	1-GHz flux/Jy: 3.9	Size/arcmin: 12
Dec: –20°14′	Spectral index: 0.5	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 ($3'$: $S = 5.8 \pm 0.6$).
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($41'' \times 63''$: $S = 3.5 \pm 0.4$).

G10.0 – 0.3		
RA: 18 ^h 05 ^m 40 ^s	1-GHz flux/Jy: 2.9	Size/arcmin: 8?
Dec: –20°26′	Spectral index: 0.8	Type: ?

Radio: Not well resolved.
X-ray: Detected.
Point sources: Associated with soft gamma repeater.
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 ($2'.6$).
 Kulkarni & Frail 1993, Nat, 365, 33. VLA at 330 MHz (smoothed to $2'$) and 1.49 GHz ($40'' \times 65''$), including association with soft gamma repeater.
 Sonobe *et al.* 1994, ApJ, 436, L23. X-ray observations.
 Kulkarni *et al.* 1994, Nat, 368, 129. VLA at 1.4 GHz ($31''$) and 8.4 GHz ($5''.5$)
 Vasisht *et al.* 1995, ApJ, 440, L65. Radio monitoring of core.
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G11.2 – 0.3

RA: 18^h08^m30^s
Dec: –19°26′

1-GHz flux/Jy: 22
Spectral index: 0.49

Size/arcmin: 4
Type: C

Probably associated with the SN of AD386.

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

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

Distance: HI absorption indicates 5 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. HI 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 HRI observations, with review of flux densities.
 Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz, plus HI absorption, HRI and IPC observations.
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (26″.5 : $S = 4.04 \pm 0.24$).
 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 : $S = 39$).
 Reynolds *et al.* 1994, MNRAS, 271, L1. ROSAT image and spectra.
 Vasisht *et al.* 1996, ApJ, 456, L59. ASCA observations.

G11.4 – 0.1

RA: 18^h07^m50^s
Dec: –19°06′

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′ : $S = 9.4$) contaminated by sidelobes of a nearby source, and Parkes 64-m at 5 GHz (4′ : $S = 2.8$).
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 : $S = 2.0 \pm 0.4$).
 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′.2 × 4′.1 : $S = 18$).
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (44″ × 63″ : $S = 5.1 \pm 0.6$).

G12.0 – 0.1

RA: 18^h09^m15^s
Dec: –18°38′

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

Size/arcmin: 7?
Type: ?

Radio: Incomplete shell, defined in E only.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 6.6$) and Parkes 64-m at 5 GHz (4′ : $S = 1.1$).
 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″ : $S = 0.7$).

G13.3 – 1.3

RA: 18^h16^m30^s
Dec: –18°01′

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

Size/arcmin: 70 × 40
Type: S?

Radio: Amorphous emission.

X-ray: Elongated emission.

Optical: Filaments in S.

Distance: Absorption indicates 2–4 kpc.

References:

Seward *et al.* 1995, ApJ, 449, 681. ROSAT detection, optical studies and observations of CO.

G13.5 + 0.2**RA:** 18^h11^m20^s
Dec: -17° 13'**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 ($S = 0.65 \pm 0.05$) and 1.4 GHz ($15'' : S = 2.67 \pm 0.5$).**G15.1 - 1.6****RA:** 18^h21^m05^s
Dec: -16° 36'**1-GHz flux/Jy:** 5.5?
Spectral index: 0.8?**Size/arcmin:** 30 × 24
Type: S**Radio:** Elongated, incomplete shell.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).**G15.9 + 0.2****RA:** 18^h16^m00^s
Dec: -15° 03'**1-GHz flux/Jy:** 5
Spectral index: 0.6?**Size/arcmin:** 7 × 5
Type: S?**Radio:** Incomplete shell, with bright concentration to the E.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3' : S = 7.7$) and Parkes 64-m at 5 GHz ($4' : S = 1.9$).Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ($6'.8 : S = 1.1 \pm 0.2$).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 ($58'' \times 44''$).Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz ($77'' \times 61'' : S = 11.2 \pm 1.0$), 1.4 GHz ($23'' \times 14'' : S = 3.9 \pm 0.1$) and 4.9 GHz ($13'' \times 16''$).**G16.7 + 0.1****RA:** 18^h18^m05^s
Dec: -14° 21'**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.**References:**Helfand *et al.* 1989, ApJ, 341, 151. VLA at 5 GHz ($5 : S = 0.95$) and 1.4 GHz ($15'' : S = 2.43$) and OSRT at 327 MHz ($S = 5.13$).**G16.8 - 1.1****RA:** 18^h22^m30^s
Dec: -14° 48'**1-GHz flux/Jy:** 2?
Spectral index: ?**Size/arcmin:** 30 × 24?
Type: ?**Radio:** Overlapping thermal and non-thermal emission, parameters uncertain.**Point sources:** Pulsar within boundary of non-thermal emission.**References:**Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2'.4), plus other observations.**G17.4 - 2.3****RA:** 18^h28^m05^s
Dec: -14° 54'**1-GHz flux/Jy:** 4.8?
Spectral index: 0.8?**Size/arcmin:** 24?
Type: S**Radio:** Incomplete, poorly defined shell.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G17.8 – 2.6

RA: 18^h30^m00^s
Dec: –14°41′

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

Size/arcmin: 24
Type: S

Radio: Well defined shell.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).

G18.8 + 0.3

Kes 67

RA: 18^h21^m10^s
Dec: –12°25′

1-GHz flux/Jy: 33
Spectral index: 0.4

Size/arcmin: 17 × 11
Type: S

Has been called G18.9+0.3.

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

Distance: HI absorption indicates > 9.5 kpc, and possibly < 19 kpc.

References:

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5′ : $S = 17 \pm 7$).
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : $S = 38$).
 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).
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).
 Milne *et al.* 1989, PASAu, 8, 187. Parkes 64-m at 8.4 GHz (3′.0 : $S = 12.9 \pm 1.0$), including polarization.
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (2′.9 × 3′.5 : $S = 55$).
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (75″ × 55″ : $S = 29.9 \pm 0.3$).

G18.9 – 1.1

RA: 18^h27^m00^s
Dec: –13°00′

1-GHz flux/Jy: 37
Spectral index: varies

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.

X-ray: Partial shell.

References:

Fürst *et al.* 1985, Nat, 314, 720. Effelsberg 100-m at 4.75 GHz (2′.4 : $S = 23.8$), plus other flux densities.
 Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (7′.2 × 8′ : $S = 82 \pm 15$), plus review of flux densities.
 Barnes & Turtle 1988, in SNRISM, p347. Molonglo at 408 MHz (2′.9 × 3′.1 : $S = 58 \pm 9$) and Parkes 64-m at 5 GHz (4′.4 × 4′.1 : $S = 23 \pm 6$).
 Patnaik *et al.* 1988, Nat, 332, 136. OSRT at 327 MHz (0′.6 × 1′.6).
 Fürst *et al.* 1989, A&A, 209, 361. Effelsberg 100-m at 4.75 GHz (2′.45 : $S = 23.8$) and VLA at 1.5 and 4.9 GHz (19″ × 14″), and Effelsberg 100-m at 1.4 GHz (9′) for HI.
 Aschenbach *et al.* 1991, A&A, 246, L32. ROSAT observations.

G20.0 – 0.2

RA: 18^h25^m20^s
Dec: –11°37′

1-GHz flux/Jy: 10
Spectral index: 0.0

Size/arcmin: 10
Type: F

Radio: Faint, filled-centre, polarized.

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′ : $S = 8.5 \pm 2$), plus review of flux densities.

G21.5 – 0.9**RA:** 18^h30^m47^s**Dec:** –10° 37′**1-GHz flux/Jy:** 6**Spectral index:** 0.0**Size/arcmin:** 1.2**Type:** F**Radio:** Filled-centre, with high frequency turnover.**X-ray:** Detected, with power-law spectrum.**Distance:** HI absorption indicates 5.5 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 HRI and IPC observations.

Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT X-ray spectrum, and VLA HI observations.Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (26''.5 : $S = 5.64 \pm 0.29$).Fürst *et al.* 1988, PASJ, 40, 347. NRO array at 22.3 GHz (4''.4 × 7''.3).Salter *et al.* 1989, A&A, 225, 167. Observations at 90.7 (29''.5 : $S = 3.8 \pm 0.4$) and 141.9 GHz ($S = 2.5 \pm 1.2$).Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz ($S = 3.94 \pm 0.70$), 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 : $S = 9$).Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.**G21.8 – 0.6**

Kes 69

RA: 18^h30^m00^s**Dec:** –10° 10′**1-GHz flux/Jy:** 69**Spectral index:** 0.5**Size/arcmin:** 20**Type:** S**Radio:** Incomplete shell.**X-ray:** Detected.**Distance:** H₂CO absorption indicates > 6.3 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. H₂CO absorption.Kundu *et al.* 1974, AJ, 79, 1332. 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' : $S = 42.3 \pm 4.6$).

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. IPC observations.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.3 × 3'.5 : $S = 132$).**G22.7 – 0.2****RA:** 18^h30^m30^s**Dec:** –09° 15′**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.**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 : $S = 82$).**G23.3 – 0.3**

W41

RA: 18^h32^m00^s**Dec:** –08° 50′**1-GHz flux/Jy:** 70**Spectral index:** 0.5**Size/arcmin:** 27**Type:** S**Radio:** Incomplete ring, in complex region, overlapping G22.7–0.2.**Point sources:** Pulsar association suggested.**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 : $S = 138$).

Gaensler & Johnston 1995, MNRAS, 275, L73. Possible pulsar association.

G23.6 + 0.3

RA: 18^h30^m20^s
Dec: -08° 15'

1-GHz flux/Jy: 8?
Spectral index: 0.3

Size/arcmin: 10?
Type: ?

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).

G24.7 - 0.6

RA: 18^h36^m00^s
Dec: -07° 35'

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' : $S = 12.3$) and Parkes 64-m at 5 GHz (4' : $S = 3.6$).
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6'.8 : $S = 2.2 \pm 0.5$).
 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'' : $S = 1.9$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G24.7 + 0.6

RA: 18^h31^m30^s
Dec: -07° 07'

1-GHz flux/Jy: 20?
Spectral index: 0.2?

Size/arcmin: 30 × 15
Type: C?

Radio: Filled-centre, with faint shell, and a compact HII 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 : $S = 19 \pm 3$) and 4.75 GHz (2'.4 : $S = 17 \pm 4$) and NRO 45-m at 10.2 GHz (2'.7 : $S = 15 \pm 3$).
 Becker & Helfand 1987, ApJ, 316, 660. VLA at 1.4 GHz (12''), and X-ray upper limit.

G27.4 + 0.0

RA: 18^h38^m40^s
Dec: -04° 59'

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, a supposed larger remnant.

Radio: Incomplete shell.

X-ray: Diffuse emission, with central compact component.

Point sources: Compact X-ray source.

Distance: HI absorption indicates 6 to 7.5 kpc.

References:

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5').
 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 : $S = 2.0 \pm 0.5$).
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3' : $S = 4.4$).
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz (60'' × 45'' : $S = 3.5$). Revise $S(408) = 10.4$, and $S(5000) = 1.9 \pm 0.2$.
 Kriss *et al.* 1985, ApJ, 288, 703. IPC and HRI 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.

G27.8 + 0.6

RA: 18^h37^m06^s
Dec: -04°28'

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

Size/arcmin: 50 × 30
Type: F

Radio: Filled-centre, with spectral turnover.

References:

Reich *et al.* 1984, A&A, 133, L4. Effelsberg 100-m at 2.7 GHz (4'.3 : $S = 23 \pm 2$), and 4.75 GHz (2'.4 : $S = 18 \pm 2$) and NRO 45-m at 10.2 GHz (smoothed to 4'.3 : $S = 8.5 \pm 2$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G28.8 + 1.5

RA: 18^h36^m30^s
Dec: -02°40'

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.

G29.7 - 0.3

Kes 75

RA: 18^h43^m48^s
Dec: -03°02'

1-GHz flux/Jy: 10
Spectral index: 0.7

Size/arcmin: 3
Type: C?

Radio: Shell with flatter spectrum emission from centre.

X-ray: Detected.

Distance: HI absorption indicates > 9 kpc and possibly at 21 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 : $S = 5 \pm 20\%$).
 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 IPC and HRI.
 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 : $S = 1.02 \pm 0.07$).
 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 : $S = 27.4$).

G30.7 - 2.0

RA: 18^h51^m50^s
Dec: -02°58'

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

Size/arcmin: 16
Type: ?

Radio: Poorly defined.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G30.7 + 1.0

RA: 18^h42^m10^s
Dec: -01°35'

1-GHz flux/Jy: 6
Spectral index: 0.4

Size/arcmin: 24 × 18
Type: S?

Radio: Non-thermal, highly polarized 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 : $S = 3.4 \pm 0.4$), plus other flux densities.
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.6 × 3'.9 : $S = 8.6$).

G31.5 – 0.6

RA: 18^h48^m35^s
Dec: –01°35′

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

Size/arcmin: 18?
Type: S?

Has been called G31.55–0.65.

Radio: Distorted shell? near HII region.

References:

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2′.4), plus other flux densities.

G31.9 + 0.0

RA: 18^h46^m50^s
Dec: –00°59′

1-GHz flux/Jy: 24
Spectral index: 0.55

3C391
Size/arcmin: 5 × 7
Type: S

Radio: Shell, brightest in NW.

X-ray: Diffuse shell.

Distance: HI absorption is seen to the tangent point (8.5 kpc).

References:

Radhakrishnan *et al.* 1972, ApJS, 24, 49. HI 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′′ : $S = 20 \pm 2$) and Effelsberg 100-m at 10.7 GHz (77′′ : $S = 7.5 \pm 0.8$).

Wang & Seward 1984, ApJ, 279, 705. IPC and HRI observations.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.4 × 3′.7 : $S = 44.8$).

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′′ : $S = 38.5 \pm 0.5$) 1.46 GHz (6′′.7) and 4.85 GHz (6′′.2 × 6′′.4), including spectral index and polarization studies.

Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G32.0 – 4.9

RA: 19^h03^m00^s
Dec: –03°00′

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

3C396.1
Size/arcmin: 60?
Type: S?

Radio: Possible large shell?

References:

Milne & Hill 1969, AuJPh, 22, 211. Parkes 64-m at 635 MHz (31′ : $S = 25 \pm 30\%$), 1410 MHz (15′ : $S = 19 \pm 15\%$) and 2650 MHz (8′.4 : $S = 8.6 \pm 30\%$). 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 ($S = 105 \pm 30$).

G32.8 – 0.1

RA: 18^h48^m50^s
Dec: –00°12′

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

Kes 78
Size/arcmin: 17
Type: S?

Part has been called G33.1–0.1.

Radio: Elongated shell?

References:

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′ : $S = 7.2 \pm 0.5$).

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 430 MHz ($S = 19.0 \pm 15.5$).

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′ : $S = 12.8$) and Parkes 64-m at 5 GHz (4′ : $S = 7.7$).

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 × 3′.8 : $S = 31.3$).

G33.2 – 0.6

RA: 18^h51^m12^s
Dec: –00°05′

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

Size/arcmin: 18
Type: S

Radio: Incomplete shell.

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 : $S = 2.6 \pm 0.3$) and 4.75 GHz (2′.5 : $S = 1.75 \pm 0.2$).
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (68″ × 52″ : $S = 2.7 \pm 0.3$).

G33.6 + 0.1

RA: 18^h50^m15^s
Dec: +00°37′

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

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: Detected.

Distance: HI absorption gives about 10 kpc.

References:

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 35.5$) and Parkes 64-m at 5 GHz (4′ : $S = 7.8$).
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 69 \pm 33$.
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′ : $S = 6.8 \pm 1.5$).
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 : $S = 11.4 \pm 1.1$).
 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 HI absorption to nearby point source, possibly extragalactic.
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source, plus IPC observations.
 Green 1989, MNRAS, 238, 737. OH absorption.
 Frail & Clifton 1989, ApJ, 336, 854. VLA at 1.4 GHz (1′ × 2′.9), including HI absorption.
 Velusamy *et al.* 1991, AJ, 102, 676. VLA at 327 MHz (1′), 1.5 (7″ × 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 × 3′.8 : $S = 34.8$).
 Seward & Velusamy 1995, ApJ, 439, 715. ROSAT observations.

G34.7 – 0.4

RA: 18^h53^m30^s
Dec: +01°18′

1-GHz flux/Jy: 230
Spectral index: 0.30

W44, 3C392

Size/arcmin: 35 × 27
Type: S

Has been called G34.6–0.5.

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

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

Point sources: Pulsar within the boundary of the remnant.

Distance: HI absorption indicates 3 kpc.

References:

Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10.7 GHz (3′ : $S = 105 \pm 7$).
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′ : $S = 177 \pm 10$).
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : $S = 299$ which is less than the 390 Jy found by Kesteven 1968, AuJPh, 21, 739 with the same telescope).
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 540 \pm 187$.
 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. IPC observations.
 Wolszczan *et al.* 1991, ApJ, 372, L99. Pulsar detection.
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.6 × 3′.8 : $S = 469$).
 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 × 7″.8) of pulsar nebula.
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.

G36.6 – 0.7

RA: 18^h58^m05^s
Dec: +02°52′

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

Size/arcmin: 25?
Type: S?

Radio: Polarized 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 : $S = 6.7$).

G36.6 + 2.6

RA: 18^h46^m20^s
Dec: +04°23′

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, in SNRISM, p293. Summary of parameters.
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).

G39.2 – 0.3

RA: 19^h01^m40^s
Dec: +05°23′

1-GHz flux/Jy: 18
Spectral index: 0.6

3C396, HC24, NRAO 593
Size/arcmin: 8 × 6
Type: S

Radio: Shell, brightest to the W, with faint “tail” to E.

X-ray: Centrally brightened.

Distance: HI absorption suggests at least 7.7 kpc.

References:

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′).
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 54 \pm 38$.
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′ : $S = 4.1 \pm 1.0$).
 Caswell *et al.* 1975, A&A, 45, 239. HI 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″ : $S = 14$) and 5 GHz, plus IPC 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 polarization, plus OSRT at 327 MHz (100″ × 31″), including review of flux densities.
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.5 × 3′.6 : $S = 42.5$).
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz for spectral index studies.

G39.7 – 2.0

RA: 19^h10^m00^s
Dec: +04°50′

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 HII 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: Distance to SS433 is 5 kpc.

References:

van den Bergh 1980, ApJ, 236, L23. Optical in H α and [SII].
 Zealey *et al.* 1980, MNRAS, 192, 731. Optical spectra.
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source (not SS433).
 Seaquist & 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 : $S = 34 \pm 4$), 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.

G40.5 – 0.5

RA: 19^h04^m45^s
Dec: +06°26′

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

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 : $S = 9.3 \pm 1.3$), and 2.7 GHz (4′.4 : $S = 7.2 \pm 0.5$), plus review of flux densities.

G41.1 – 0.3

3C397

RA: 19^h05^m08^s
Dec: +07°03′

1-GHz flux/Jy: 22
Spectral index: 0.48

Size/arcmin: 4.5 × 2.5
Type: S

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

X-ray: Brighter to the E and W.

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

References:

Kundu *et al.* 1974, AJ, 79, 1332. 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′ : $S = 21.3 \pm 1.2$ for both components).
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 82 \pm 51$, also Algonquin 46-m at 10.6 GHz (3′ : $S = 12 \pm 2$), and Haystack 36-m at 15.5 GHz (2′.3 : $S = 8.5 \pm 3.0$).
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 29.8$) and Parkes 64-m at 5 GHz (4′ : $S = 8.7$).
 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 HRI and IPC observations.
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to 30″ : $S = 1.10 \pm 0.19$).
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.5 × 3′.6 : $S = 46.3$).
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz, for spectral index studies.

G42.8 + 0.6

RA: 19^h04^m55^s
Dec: +09°00′

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.

References:

Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2′.4 : $S = 1.5 \pm 0.2$), plus other flux densities.
 Vasisht *et al.* 1994, ApJ, 431, L35. VLA at 327 MHz (3′.2 × 3′.4).

G43.3 – 0.2

W49B

RA: 19^h08^m44^s
Dec: +09°01′

1-GHz flux/Jy: 38
Spectral index: 0.48

Size/arcmin: 4 × 3
Type: S

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

X-ray: Filled-centre.

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).
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.
 Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz (58″ : $S = 9.0 \pm 0.7$).
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).
 Pye *et al.* 1984, MNRAS, 207, 649. HRI and IPC 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″ : $S = 6.90 \pm 0.38$).
 Moffett & Reynolds 1994, ApJ, 437, 705. VLA at 330 MHz (6′.7 × 7′.7 : $S = 64.4$), 1.48 GHz (4′.8 × 5′.2 : $S = 31.8$) and 4.85 GHz (4′.0 × 4′.1), including polarization.
 Fujimoto *et al.* 1995, PASJ, 47, L31. ASCA observations.

G43.9 + 1.6

RA: 19^h03^m30^s
Dec: +10°25'

1-GHz flux/Jy: 8.6?
Spectral index: 0.2?

Size/arcmin: 60?
Type: S?

Radio: Large, poorly defined faint shell.

References:

Reich *et al.* 1988, in SNRISM, p293. 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).

G45.7 - 0.4

RA: 19^h14^m05^s
Dec: +11°04'

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 : $S = 2.6 \pm 0.3$), plus other flux densities.

G46.8 - 0.3

(HC30)

RA: 19^h15^m50^s
Dec: +12°04'

1-GHz flux/Jy: 14
Spectral index: 0.5

Size/arcmin: 17 × 13
Type: S

Has been called G46.6-0.2.

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

Distance: HI absorption suggests 6.8-8.8 kpc.

References:

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5' : $S = 9.8 \pm 0.9$), and VRO 37-m at 1.7 GHz ($S = 14.5 \pm 5.5$).
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3' : $S = 20.3$) and Parkes 64-m at 5 GHz (4' : $S = 7.1$).
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 46 \pm 21$.
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6'.8 : $S = 5.9 \pm 0.6$).
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).
 Sato 1979, ApL, 20, 43. HI absorption.
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (58'' × 53'' : $S = 13.3 \pm 0.1$).

G49.2 - 0.7

(W51)

RA: 19^h21^m30^s
Dec: +14°00'

1-GHz flux/Jy: 160?
Spectral index: 0.3?

Size/arcmin: 30
Type: S?

Radio: In complex region, parameters uncertain.

X-ray: Elongated east-west.

Distance: HI absorption suggests 4.1 kpc.

References:

Shaver & Goss 1970, AuJPA, 14, 133. Parkes 64-m at 5 GHz (4').
 Sato 1973, PASJ, 25, 135. HI absorption.
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5'), $S = 51.5 \pm 3.2$, 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. IPC observations.
 Copetti & Schmidt 1991, MNRAS, 250, 127. CLFST at 151 MHz.
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.1 × 3'.5).
 Subrahmanyam & 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.

G53.6 - 2.2

3C400.2, NRAO 611

RA: 19^h36^m30^s
Dec: +17°08'**1-GHz flux/Jy:** 8
Spectral index: 0.75**Size/arcmin:** 28 × 33
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:** Mean optical velocity indicates 6.7 kpc.**References:**

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

G54.1 + 0.3**RA:** 19^h28^m28^s
Dec: +18°46'**1-GHz flux/Jy:** 0.5
Spectral index: 0.1**Size/arcmin:** 1.5
Type: F?**Radio:** Filled-centre.**X-ray:** Detected.**References:**

Green 1985, MNRAS, 216, 691. 5km at 2.7 GHz ($7'' \times 20''$).
 Reich *et al.* 1985, A&A, 151, L10. Effelsberg 100-m at 4.75 GHz ($2'.4 : S = 0.37 \pm 0.04$)
 Velusamy & Becker 1988, AJ, 95, 1162. VLA at 1.4 ($14'' : S = 0.48 \pm 0.03$), 1.6 ($14'' : S = 0.42 \pm 0.03$) and 5 GHz
 ($5'' : S = 0.33 \pm 0.02$), OSRT at 327 MHz ($S = 0.50 \pm 0.08$), plus review of flux densities.
 Seward 1989, AJ, 97, 481. IPC observations

G54.4 - 0.3

(HC40)

RA: 19^h31^m10^s
Dec: +18°50'**1-GHz flux/Jy:** 28
Spectral index: 0.5**Size/arcmin:** 40
Type: S

Has been called G54.5-0.3.

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

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5' : S = 34.4 \pm 5.0$).
 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 ($1'.3 \times 2'.6 : S = 18 \pm 4$).
 Velusamy *et al.* 1986, JA&A, 7, 105. WSRT at 609 MHz ($50'' \times 191''$ smoothed to $100'' \times 200''$).
 Junkes *et al.* 1992, A&AS, 91, 1. Surrounding CO.
 Junkes *et al.* 1992, A&A, 261, 289. Nearby IRAS sources.

G55.7 + 3.4**RA:** 19^h19^m10^s
Dec: +21°38'**1-GHz flux/Jy:** 1.4
Spectral index: 0.6**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 ($57'' \times 156'' : S = 1.9 \pm 0.2$) and 1415 MHz ($27'' \times 72'' : S = 1.0 \pm 0.1$).

G57.2 + 0.8

(4C21.53)

RA: 19^h32^m50^s**1-GHz flux/Jy:** 1.8?**Size/arcmin:** 12?**Dec:** +21°50′**Spectral index:** ?**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′).**G59.5 + 0.1****RA:** 19^h40^m25^s**1-GHz flux/Jy:** 3?**Size/arcmin:** 5**Dec:** +23°28′**Spectral index:** ?**Type:** S**Radio:** Incomplete shell.**References:**Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz (2′.5 × 1′.0 : $S = 5.1 \pm 0.2$), and northern sky survey at 4.9 GHz.**G59.8 + 1.2****RA:** 19^h36^m50^s**1-GHz flux/Jy:** 1.6**Size/arcmin:** 20 × 16?**Dec:** +24°12′**Spectral index:** 0.5**Type:** ?

Has been called G59.7+1.2.

Radio: Poorly defined source.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).**G65.1 + 0.6****RA:** 19^h52^m30^s**1-GHz flux/Jy:** 6**Size/arcmin:** 90 × 50**Dec:** +28°25′**Spectral index:** 0.6**Type:** S**Radio:** Large, faint shell.**References:**Landecker *et al.* 1990, A&A, 232, 207. DRAO at 408 MHz (3′.5 × 7′.0 : $S = 9.5 \pm 0.1$), and 1.4 GHz (1′.0 × 2′.0 : $S = 5.4 \pm 1.0$).**G65.3 + 5.7****RA:** 19^h31^m00^s**1-GHz flux/Jy:** 52?**Size/arcmin:** 310 × 240**Dec:** +31°05′**Spectral index:** 0.6?**Type:** S?

Has been called G65.2+5.7.

Radio: Large, faint ring? near S91 and S94.**Optical:** Strong in H α + [NII] and [OIII].**X-ray:** Detected.**Distance:** Mean optical velocity suggests 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′ : $S = 42.4 \pm 1.6$), estimate $S(408) = 91 \pm 5$ 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. IPC observations.

G65.7 + 1.2

DA 495

RA: $19^{\text{h}}50^{\text{m}}10^{\text{s}}$ **1-GHz flux/Jy:** 5.1**Size/arcmin:** 18**Dec:** $+29^{\circ}18'$ **Spectral index:** 0.6**Type:** ?

Has mistakenly been called G55.7+1.2.

Radio: Filled-centre or thick shell?

References:

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ($5' : S = 2.8 \pm 0.4$), and VRO 37-m at 1.7 GHz ($S = 4.4 \pm 0.5$), plus review of flux densities.

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 8.7 \pm 4.9$, $S(318) = 9.7 \pm 2.2$.

Landecker & Caswell 1983, AJ, 88, 1810. DRAO at 1.4 GHz ($0'.9 \times 1'.5 : S = 4.4 \pm 0.2$).

Velusamy *et al.* 1989, JA&A, 10, 161. OSRT at 327 MHz ($36'' \times 64''$), WSRT at 610 MHz ($62''$) and VLA at 1.4 GHz ($36''$ and $12''$), including IRAS imaging.

G67.7 + 1.8**RA:** $19^{\text{h}}52^{\text{m}}34^{\text{s}}$ **1-GHz flux/Jy:** 1.4**Size/arcmin:** 9**Dec:** $+31^{\circ}21'$ **Spectral index:** 0.3**Type:** S

Radio: Double arc shell.

References:

Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz ($1'.9 \times 1'.0 : S = 1.9 \pm 0.1$), and northern sky survey at 4.9 GHz ($S = 0.42 \pm 0.05$).

G68.6 - 1.2**RA:** $20^{\text{h}}06^{\text{m}}40^{\text{s}}$ **1-GHz flux/Jy:** 0.7?**Size/arcmin:** $28 \times 25?$ **Dec:** $+30^{\circ}28'$ **Spectral index:** 0.0?**Type:** ?

Radio: Faint, poorly defined source.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz ($4'.3$).

G69.0 + 2.7

CTB 80

RA: 19^h51^m30^s**1-GHz flux/Jy:** 120?**Size/arcmin:** 80?**Dec:** +32°45'**Spectral index:** varies**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.

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, JA&A, 3, 253. VLA of compact sources.
- Blair *et al.* 1984, ApJ, 282, 161. Optical images and spectra.
- Wang & Seward 1984, ApJ, 285, 607. IPC 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 : $S = 67.5 \pm 10.5$), Effelsberg 100-m at 1.41 (9' : $S = 62 \pm 9$), 1.72 (7'.6 : $S = 66 \pm 5$), 2.7 (4'.5 : $S = 52 \pm 4$) and 4.75 GHz (2'.4 : $S = 44 \pm 3.3$), plus review of flux densities.
- Kulkarni *et al.* 1988, Nat, 331, 50. Pulsar detection.
- Angelini *et al.* 1988, ApJ, 330, L43. EXOSAT spectra.
- Fesen *et al.* 1988, Nat, 334, 229. IRAS of surrounding shell.
- 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.

G69.7 + 1.0**RA:** 20^h00^m45^s**1-GHz flux/Jy:** 1.6**Size/arcmin:** 16**Dec:** +32°35'**Spectral index:** 0.8**Type:** S

Radio: Poorly resolved source.

References:

- Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.
- Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

G73.9 + 0.9**RA:** 20^h12^m20^s**1-GHz flux/Jy:** 9?**Size/arcmin:** 22?**Dec:** +36°03'**Spectral index:** 0.3?**Type:** S?

Radio: Incomplete, clumpy shell.

Optical: Weak shell.

References:

- Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2'.4 : $S = 6.7 \pm 0.5$), plus other flux densities.
- Chastenay & Pineault 1988, in SNRISM, p297. 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 : $S = 12.7 \pm 1.2$) and 1.4 GHz (1'.0 × 1'.7 : $S = 7.4 \pm 1.0$).
- Lozinskaya *et al.* 1993, AZh, 70, 469. (See also AR, 37, 240.) Optical observations.

G74.0 – 8.5

Cygnus Loop

RA: 20^h49^m00^s**1-GHz flux/Jy:** 210**Size/arcmin:** 230 × 160**Dec:** +30°30′**Spectral index:** varies**Type:** S**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.**References:**

- Keen *et al.* 1973, A&A, 28, 197. Effelsberg 100-m at 2.7 GHz (4'.8), NE at 10.7 GHz (1'.25).
 Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz (56'' × 107'') of NE area (NGC6992) only.
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of CL4.
 Fesen *et al.* 1982, ApJ, 262, 171. Optical spectroscopy.
 Hester *et al.* 1983, ApJ, 273, 219. Optical imagery.
 Ku *et al.* 1984, ApJ, 278, 615. IPC and HRI X-ray observations.
 Green 1984, MNRAS, 211, 433. Most of remnant at 408 MHz (80'' × 160'') with OMT.
 Charles *et al.* 1985, ApJ, 295, 456. IPC observations.
 Braun & Strom 1986, A&A, 164, 208. IRAS observations.
 Straka *et al.* 1986, ApJ, 306, 266. Radio and optical comparison of NE. VLA at 1.6 GHz (4''.7) plus optical.
 Raymond *et al.* 1988, ApJ, 324, 869. Detailed optical study of filaments.
 Ballet *et al.* 1989, A&A, 211, 217. [FeX] and [FeXIV] spectroscopy.
 Ballet & Rothenflug 1989, A&A, 218, 277. EXOSAT observations.
 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.
 Blair *et al.* 1991, ApJ, 374, 202. Far UV mapping.
 Blair *et al.* 1991, ApJ, 379, L33. UV spectroscopy.
 Greidanus & Strom 1992, A&A, 257, 265. Optical kinematics.
 Shull & Hippelein 1992, ApJ, 383, 714. Optical kinematics and proper motion.
 Fesen *et al.* 1992, AJ, 104, 719. H α imagery.
 Cornett *et al.* 1992, ApJ, 395, L9. UV imagery.
 Long *et al.* 1992, ApJ, 400, 214. Optical of Balmer dominated filament.
 Arendt *et al.* 1992, ApJ, 400, 562. IRAS observations.
 Vancura *et al.* 1993, ApJ, 417, 663. Far UV observations.
 Hester *et al.* 1994, ApJ, 420, 721. H α , [OIII] and other optical observations of Balmer dominated filaments in NE.
 Miyata *et al.* 1994, PASJ, 46, L101. X-ray observations of NE.
 Graham *et al.* 1995, ApJ, 444, 787. X-ray and optical studies of interaction with surroundings.
 Sauvageot & Decourchelle 1995, A&A, 296, 201. [FeX] and [FeXIV] observations.

G74.9 + 1.2

CTB 87

RA: 20^h14^m10^s**1-GHz flux/Jy:** 9**Size/arcmin:** 8 × 6**Dec:** +37°03′**Spectral index:** varies**Type:** F**Radio:** Filled-centre, with high polarization and high frequency turnover.**X-ray:** Centrally brightened.**Distance:** HI absorption indicates 12 kpc.**Point sources:** Extragalactic compact source is nearby.**References:**

- Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 12.2 \pm 9.7$, $S(318) = 17.7 \pm 5.0$.
 Weiler & Shaver 1978, A&A, 70, 389. WSRT at 610 MHz (57'' × 94'' : $S = 9.1 \pm 1.2$), 1.4 (24'' × 40'' : $S = 8.7 \pm 1.2$) and 5 GHz (24'' × 40'' : $S = 5.6 \pm 1.3$).
 Geldzahler *et al.* 1980, A&A, 84, 237. Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 7.6 \pm 0.5$).
 Wilson 1980, ApJ, 241, L19. IPC observations.
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI 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'' : $S = 1.47 \pm 0.19$).
 Green & Gull 1989, MNRAS, 237, 555. VLA at 1.4 GHz (1'.2 × 1'.4) including HI.
 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 × 5'.8 : $S = 11.6 \pm 0.4$) and 1.4 GHz (1'.0 × 1'.7 : $S = 7.2 \pm 0.3$).
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.
 Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz (3'.5 × 5'.2 : $S = 13.3 \pm 0.8$) and Effelsberg 100-m at 4.8 GHz ($S = 7.5 \pm 0.7$).
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.
 Cho *et al.* 1994, AJ, 108, 634. CO of adjacent molecular clouds.

G76.9 + 1.0

RA: 20^h20^m30^s
Dec: +38°33'

1-GHz flux/Jy: 2?
Spectral index: 0.6?

Size/arcmin: 9 × 12
Type: ?

Radio: Diffuse, non-thermal.

References:

Landecker *et al.* 1993, A&A, 276, 522. VLA at 1.49 GHz (14''), 4.86 GHz (13'' × 16'') and 8.55 GHz (11'' × 12''), including polarization and review of flux densities.

G78.2 + 2.1

RA: 20^h19^m00^s
Dec: +40°15'

1-GHz flux/Jy: 340
Spectral index: 0.5

DR4, γ Cygni
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.

References:

Higgs *et al.* 1977, AJ, 82, 718. DRAO at 1.4 GHz (2' × 3' : $S = 270 \pm 40$) 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.

Landecker *et al.* 1980, A&AS, 39, 133. DRAO H_I observations (2' × 3'.1).

Higgs *et al.* 1983, in IAU101, p281. IPC observations.

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 H_I observations.

Fukui & Tatematsu 1988, in SNRISM, p261. 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 × 5'.8 : $S = 480 \pm 60$) and 1.4 GHz (1'.0 × 1'.7 : $S = 270 \pm 40$).

Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz (3'.5 × 5'.2 : $S = 540 \pm 40$) and Effelsberg 100-m at 4.8 GHz ($S = 150 \pm 15$).

Esposito *et al.* 1996, ApJ, 461, 820. Associated gamma-ray emission.

G82.2 + 5.3

RA: 20^h17^m30^s
Dec: +45°20'

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

W63
Size/arcmin: 95 × 65
Type: S

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' : $S = 59.0 \pm 3.5$).

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. IPC observations.

Higgs *et al.* 1991, JRASC, 85, 24. DRAO at 408 MHz (3'.4 × 5'.0 : $S = 165 \pm 21$), plus review of flux densities.

G84.2 - 0.8

RA: 20^h51^m30^s
Dec: +43°16'

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.

References:

Matthews *et al.* 1977, A&A, 55, 1. WSRT at 610 MHz (56'' × 81'' : $S = 12.4 \pm 1.5$) and Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 6.8 \pm 1.3$).

Matthews & Shaver 1980, A&A, 87, 255. WSRT at 1415 MHz (23'' × 32''), and Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 5.6 \pm 0.5$).

Feldt & Green 1993, A&A, 274, 421. DRAO at 1.4 GHz (1' × 1'.5), including H_I, plus CO observations.

G84.9 + 0.5**RA:** 20^h48^m45^s**Dec:** +44°42′**1-GHz flux/Jy:** 0.8**Spectral index:** 0.4**Size/arcmin:** 6**Type:** S**Radio:** Incomplete shell.**References:**Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz (1′.4 × 1′.0 : $S = 1.2 \pm 0.1$), and northern sky survey at 4.9 GHz ($S = 0.40 \pm 0.01$).**G89.0 + 4.7**

HB21

RA: 20^h43^m30^s**Dec:** +50°25′**1-GHz flux/Jy:** 220**Spectral index:** 0.40**Size/arcmin:** 120 × 90**Type:** S**Radio:** Distorted shell (4C50.52, an extragalactic double, is within the boundary of the remnant).**Optical:** Filaments possibly associated.**X-ray:** Detected from incomplete mapping.**References:**Hirabayashi & Takahashi 1972, PASJ, 24, 231. 30-m dish at 4.2 GHz (11′ : $S = 160 \pm 40$).Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5′ : $S = 148 \pm 16$), plus optical filaments.

Hill 1974, MNRAS, 169, 59. HMT at 1.4 GHz (3′ × 3′.9).

Haslam *et al.* 1975, A&A, 39, 453. Effelsberg 100-m at 2.7 GHz (4′.4)Reich *et al.* 1983, in IAU101, p377. Effelsberg 100-m at 4.75 GHz (2′.5).

Leahy 1987, MNRAS, 228, 907. IPC observations.

Fukui & Tatematsu 1988, in SNRISM, p261. 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.**G93.3 + 6.9**

DA 530, 4C(T)55.38.1

RA: 20^h51^m00^s**Dec:** +55°10′**1-GHz flux/Jy:** 9**Spectral index:** 0.54**Size/arcmin:** 27 × 20**Type:** S

Has been called G93.2+6.7.

Radio: Shell, with two bright limbs, highly polarized.**References:**Roger & Costain 1976, A&A, 51, 151. DRAO at 1.42 GHz (2′ × 2′.4 : $S = 6.9$).Haslam *et al.* 1980, A&A, 92, 57. Effelsberg 100-m at 1.72 GHz (7′.6 : $S = 6.47 \pm 0.52$) and 2.7 GHz (4′.4 : $S = 5.64 \pm 0.64$), plus review of flux densities.Lalitha *et al.* 1984, A&A, 131, 196. Effelsberg 100-m at 4.75 GHz (smoothed to 3′ : $S = 4.01 \pm 0.57$).**G93.7 – 0.2**

CTB 104A, DA 551

RA: 21^h27^m45^s**Dec:** +50°35′**1-GHz flux/Jy:** 65**Spectral index:** 0.3**Size/arcmin:** 80**Type:** S

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

Radio: Faint shell with possible a steep spectrum core.**References:**Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′ : $S = 18.4 \pm 1.0$).Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz (7′.6 : $S = 53.5 \pm 5.0$), plus review of flux densities.Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to 2′ : $S = 58 \pm 6$).Mantovani *et al.* 1991, A&A, 247, 545. Effelsberg 100-m at 4.75 GHz (smoothed to 3′ : $S = 33.5 \pm 4.0$), including polarization, plus review of flux densities.

G94.0 + 1.0

3C434.1

RA: 21^h23^m10^s**1-GHz flux/Jy:** 15**Size/arcmin:** 30 × 25**Dec:** +51°40′**Spectral index:** 0.44**Type:** S**Radio:** Incomplete shell, in complex region.**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ($5' : S = 6.1 \pm 0.8$), and VRO 37-m at 1.7 GHz ($S = 11 \pm 3$).
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5' : S = 5.8 \pm 0.4$). Also NRAO 140-ft at 5 GHz ($6'$).
 Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz ($7'.6 : S = 12.0 \pm 1.3$), plus review of flux densities.
 Goss *et al.* 1984, A&A, 138, 469. WSRT at 610 MHz (smoothed to $100'' : S = 16 \pm 1.7$) and Effelsberg 100-m at 4.75 GHz ($2'.4 : S = 7.2 \pm 0.5$).
 Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to $2' : S = 16 \pm 3$).

G109.1 – 1.0

CTB 109

RA: 22^h59^m30^s**1-GHz flux/Jy:** 20**Size/arcmin:** 28**Dec:** +58°37′**Spectral index:** 0.50**Type:** S**Radio:** Semicircular shell, with the Molecular cloud S152 is to the immediate W.**X-ray:** Incomplete shell.**Point sources:** Pulsar at W edge.**References:**

Hughes *et al.* 1981, ApJ, 246, L127. WSRT at 610 MHz ($1' : S = 40 \pm 5$) shows bad CLEAN artefacts.
 Blair & Kirshner 1981, Nat, 291, 132. Optical spectra.
 Downes 1983, MNRAS, 203, 695. Effelsberg 100-m at 2.7 GHz ($4'.4 : S = 13.0 \pm 1.5$).
 Gregory *et al.* 1983, in IAU101, p429. VLA at 1.4 GHz ($1'$), NRAO 300-ft at 5 GHz ($3'$) and IPC observations.
 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 ($20'' : S = 26 \pm 3$) 1.4 GHz ($10''$), DRAO at 1.4 GHz ($1' \times 1'.2 : S = 16.8 \pm 2$) and Algonquin 46-m at 6.5 GHz ($4'.5 : S = 6.7 \pm 1$).
 Braun & Strom 1986, A&AS, 63, 345. WSRT HI observations.
 Tatematsu *et al.* 1987, PASJ, 39, 755. NRO 45-m at 10 GHz ($2'.7$), plus polarization.
 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.
 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.

G111.7 – 2.1

Cassiopeia A, 3C461

RA: 23^h21^m10^s**1-GHz flux/Jy:** 2720**Size/arcmin:** 5**Dec:** +58°32′**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 flocculli, with many filaments at large radii.

X-ray: Incomplete shell.

Distance: Optical expansion, plus proper motions indicate 2.8 kpc.

References:

- Bell *et al.* 1975, Nat, 257, 463. 5km at 5 GHz ($2'' \times 2''.3$).
- Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ($58'' : S = 419.1 \pm 1.7$).
- Fabian *et al.* 1980, MNRAS, 193, 175. HRI observations.
- Dickel *et al.* 1982, ApJ, 257, 145. Comparison of X-ray, Radio and HRI.
- Kamper & van den Bergh 1983, in IAU101, p55. Optical expansion.
- Markert *et al.* 1983, ApJ, 268, 778. X-ray asymmetry.
- Tuffs 1986, MNRAS, 219, 13. Proper motions from 5km maps at 5 GHz ($2'' \times 2''.3$) between 1974 and 1978.
- Mezger *et al.* 1986, A&A, 167, 145. 247-GHz map ($70''$).
- Tsunemi *et al.* 1986, ApJ, 306, 248. X-ray spectrum.
- Fesen *et al.* 1987, ApJ, 313, 378. Optical, of fast moving flocculli.
- Fesen *et al.* 1988, ApJ, 329, L89. Optical, flocculli, and "flare".
- Jansen *et al.* 1988, ApJ, 331, 949. EXOSAT observations.
- Woan & Duffett-Smith 1990, MNRAS, 243, 87. Structure at 81.5 MHz.
- Fesen 1990, AJ, 99, 1904. [NeIII] optical imagery.
- Rees 1990, MNRAS, 243, 637. Flux density decrease at 38 MHz.
- Greidanus & Strom 1991, A&A, 249, 521. $20\mu\text{m}$ observations of part of shell.
- Anderson *et al.* 1991, ApJ, 373, 146. VLA at 1.4 and 5 GHz ($1''.3$) for spectral variations.
- Hook *et al.* 1992, A&A, 255, 285. Flux density decrease at 81.5 MHz.
- Wilson *et al.* 1993, A&A, 280, 221. Molecular emission towards remnant.
- Holt *et al.* 1994, PASJ, 46, L151. X-ray spectral mapping.
- Woan & Duffett-Smith 1993, MNRAS, 260, 693. Deep pulsar search.
- Guame *et al.* 1994, ApJ, 425, 127. NH₃ absorption and CO observations.
- Iyudin *et al.* 1994, A&A, 284, L1. Gamma ray line observations.
- Reed *et al.* 1995, ApJ, 440, 706. Optical spectra, for 3-d structure.
- Anderson *et al.* 1995, ApJ, 441, 300. VLA at 1.4 GHz and 4.8 GHz (both $1''.3$), for polarization studies.
- Anderson & Rudnick 1995, ApJ, 441, 307. VLA at 1.4 GHz and 4.8 GHz, for proper motion studies.
- The *et al.* 1995, ApJ, 444, 244. Gamma ray observations.
- Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.
- Liszt & Lucas 1995, A&A, 294, 811. NRAO 12-m observations of molecular emission and absorption.
- Lawrence *et al.* 1995, AJ, 109, 2635. Optical imaging spectroscopy.
- 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.
- Agafanov 1996, A&A, 306, 578. Flux density decrease at 102 MHz.

G112.0 + 1.2**RA:** 23^h13^m40^s**1-GHz flux/Jy:** 7?**Size/arcmin:** 30?**Dec:** +61°30′**Spectral index:** 0.6?**Type:** S?

Radio: Non-thermal source hinted by Bologna survey.

References:

- Bonsignori-Facondi & Tomasi 1979, A&A, 77, 93. Bologna at 408 MHz ($4'.2 \times 110' : S = 11 \pm 30\%$).

G114.3 + 0.3

RA: 23^h34^m45^s
Dec: +61°38'

1-GHz flux/Jy: 6?
Spectral index: 0.3?

Size/arcmin: 90 × 55
Type: S

Radio: Shell, with HII region S165 within the boundary of the remnant.

Distance: Possible association with HI features suggests 3.0–3.8 kpc.

Point sources: Pulsar near centre of remnant.

References:

Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 3.6$) and $S(1.4) = 4.4$ from 1.4 GHz survey data, plus HI from Maryland-Green Bank survey.
 Kulkarni *et al.* 1993, Nat, 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.

G116.5 + 1.1

RA: 23^h51^m20^s
Dec: +62°58'

1-GHz flux/Jy: 11?
Spectral index: 0.8?

Size/arcmin: 80 × 60
Type: S

Radio: Distinct shell, with high polarization.

Distance: Possible association with HI features suggests 3.6–5.2 kpc.

References:

Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 4.7 \pm 0.4$) and $S(1.4) = 8.0 \pm 0.8$ from 1.4 GHz survey data, plus HI from Maryland-Green Bank survey.

G116.9 + 0.2

RA: 23^h56^m40^s
Dec: +62°10'

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

CTB 1
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.

Point sources: Pulsar nearby.

Distance: Possible association with HI features suggests 2.8–4.0 kpc, mean optical velocity suggests 2.7 kpc.

References:

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5' : $S = 3.9 \pm 1.0$), and VRO 37-m at 1.7 GHz ($S = 5.5 \pm 2.0$), plus review of flux densities.
 van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5' : $S = 4.2 \pm 0.2$).
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6'.8 : $S = 3.0 \pm 0.3$).
 Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz (56'' × 64'') and 1.4 GHz (22'' × 25'').
 Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz (4'.4 : $S = 4.8 \pm 0.4$) and $S(1.4) = 7.8 \pm 0.8$ from 1.4 GHz survey data, plus HI 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 HI (2' × 2'.3 : $S = 8.3 \pm 0.5$), plus review of flux densities.
 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.

G117.4 + 5.0

RA: 23^h52^m30^s
Dec: +67°30'

1-GHz flux/Jy: 30?
Spectral index: 0.5?

Size/arcmin: 60 × 80?
Type: S?

Radio: Non-thermal source hinted by Bologna survey.

References:

Bonsignori-Facondi & Tomasi 1979, A&A, 77, 93. Bologna at 408 MHz (4'.2 × 110' : $S = 45 \pm 30\%$).

G119.5 + 10.2		CTA 1
RA: 00 ^h 04 ^m 00 ^s	1-GHz flux/Jy: 36	Size/arcmin: 90?
Dec: +72°30′	Spectral index: 0.3	Type: S

Radio: Incomplete shell, poorly defined in north.
Optical: Faint diffuse nebulosities.
X-ray: Centrally brightend.

References:
 Sieber *et al.* 1979, A&A, 74, 361. Effelsberg 100-m at 2.7 GHz ($4'.4 : S = 23.6 \pm 2.8$).
 Sieber *et al.* 1981, A&A, 103, 393. Effelsberg 100-m at 2.7 GHz and 1.7 GHz ($7'.6 : S = 31.6 \pm 2.5$), and 6C at 151 MHz ($4' : S = 62.6 \pm 6$).
 Fesen *et al.* 1981, ApJ, 247, 148. Optical, including spectra.
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.
 Seward 1990, ApJS, 73, 781. IPC 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 ($1' : S = 34 \pm 4$), plus HI and IRAS.
 Seward *et al.* 1995, ApJ, 453, 284. ROSAT observations.

G120.1 + 1.4		Tycho, 3C10, SN1572
RA: 00 ^h 22 ^m 30 ^s	1-GHz flux/Jy: 56	Size/arcmin: 8
Dec: +63°52′	Spectral index: 0.61	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, coincident with the radio shell, brighter to the NE.

Point sources: Faint radio source near centre of the remnant, thought to be extragalactic.

Distance: HI absorption gives 4–5 kpc, optical proper motion and modelled shock velocity gives 2.3 kpc.

References:

- Duin & Strom 1975, A&A, 39, 33. WSRT at 610 MHz ($57'' \times 64''$) and 5 GHz ($7'' \times 8''$).
 Klein *et al.* 1979, A&A, 76, 120. Effelsberg 100-m at 10.7 GHz ($1'.2 : S = 13.1 \pm 0.8$), plus review of flux densities.
 Strom *et al.* 1982, MNRAS, 200, 473. WSRT at 1415 MHz ($27'' \times 31''$) from 1971 and 1979, for expansion.
 Dickel *et al.* 1982, ApJ, 257, 145. Comparison of Radio, X-ray and Optical.
 Reid *et al.* 1982, ApJ, 261, 485. IPC observations.
 Seward *et al.* 1983, ApJ, 266, 287. HRI observations.
 Tan & Gull 1985, MNRAS, 216, 949. 5km at 2.7 GHz ($4''$) from 1980 and 1983, and OMT 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 ($1''.5$) polarization 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.

G126.2 + 1.6**RA:** 01^h18^m30^s**Dec:** +64°00′**1-GHz flux/Jy:** 7
Spectral index: varies**Size/arcmin:** 70
Type: S?**Radio:** Poorly defined shell.**Optical:** Filaments detected.**References:**Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ : $S = 6.8 \pm 0.7$) and 2.7 GHz (4′.4 : $S = 3.9 \pm 0.4$).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 : $S = 12 \pm 2.5$) 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.**G127.1 + 0.5****RA:** 01^h25^m00^s**Dec:** +62°55′**1-GHz flux/Jy:** 13
Spectral index: 0.6**Size/arcmin:** 45
Type: S

R5

Has been called G127.3+0.7.

Radio: Distinct shell, with bright central source.**Point sources:** Flat radio spectrum (extragalactic) source at centre of remnant.**Optical:** Detected.**Distance:** 1.2–1.3 kpc if associated with NGC559.**References:**

Caswell 1977, MNRAS, 181, 789. HMT at 1.42 GHz (3′.5 × 3′.9), plus other observations of central source.

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.Pauls 1977, A&A, 59, L13. Effelsberg 100-m at 1.4 GHz (9′ : $S = 8 \pm 1$).Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ : $S = 10.8 \pm 1.3$).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, JA&A, 5, 425. WSRT HI absorption of central source.

Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz (3′.5 × 3′.9 : $S = 17.9 \pm 2.0$) and 1.4 GHz (1′.13 × 1′.0 : $S = 10.1 \pm 0.8$), plus review of flux densities.Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.

G130.7 + 3.1

3C58, SN1181

RA: 02^h01^m55^s**1-GHz flux/Jy:** 33**Size/arcmin:** 9 × 5**Dec:** +64°35′**Spectral index:** 0.10**Type:** F

This is the remnant of the SN of AD1181.

Radio: Filled-centre, highly polarized, with high frequency turnover.

Optical: Faint filaments.

X-ray: Centrally brightened with power-law spectrum.

Point sources: Compact source in X-rays.

Distance: HI absorption indicates 3.2 kpc.

References:

- Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz (58'' : $S = 26.7 \pm 0.5$).
 Wilson & Weiler 1976, A&A, 49, 357. WSRT at 610 MHz (58'' × 64''), 1.4 GHz (24'' × 27'') and 5 GHz (7'' × 8'').
 van den Bergh 1978, ApJ, 220, L9. Optical observations.
 Becker *et al.* 1982, ApJ, 255, 557. X-ray observations.
 Green & Gull 1982, Nat, 299, 606. HI 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. CLFST at 151 MHz (1'.2 × 1'.3 : $S = 36 \pm 4$), 5km at 2.7 GHz (4''), plus IPC 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 : $S = 24.2 \pm 1.4$).
 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'' : $S = 15.0 \pm 2.0$), 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. HI absorption.
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.
 Helfand *et al.* 1995, ApJ, 453, 741. ROSAT observations.

G132.7 + 1.3

HB3

RA: 02^h14^m00^s**1-GHz flux/Jy:** 45**Size/arcmin:** 80**Dec:** +62°30′**Spectral index:** 0.6**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.

Distance: Interaction with surroundings suggests 2.2 kpc.

References:

- van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5' : $S = 33.8 \pm 7.0$).
 d'Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.
 Read 1981, MNRAS, 194, 863. 6C at 151 MHz (4'.4) and HMT at 1.4 GHz (2') showing HI shell.
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
 Fesen & Gull 1983, PASP, 95, 196. Optical image.
 Leahy *et al.* 1985, ApJ, 294, 183. IPC observations.
 Landecker *et al.* 1987, AJ, 94, 111. DRAO at 408 MHz (3'.5 × 4' : $S = 75 \pm 15$), plus review of flux densities.
 Routledge *et al.* 1991, A&A, 247, 529. DRAO at 1.4 GHz (1'.0 × 1'.1) for HI, plus CO observations.
 Fesen *et al.* 1995, AJ, 110, 2876. Optical imaging and spectroscopy, DRAO at 408 MHz (3'.5 × 4') and 1.4 GHz (1'.0 × 1'.1).

G152.2 – 1.2**RA:** 04^h05^m30^s**1-GHz flux/Jy:** 16?**Size/arcmin:** 110?**Dec:** +48°24′**Spectral index:** 0.7?**Type:** S?

Radio: Non-thermal source hinted by Bologna survey.

References:

- Bonsignori-Facondi & Tomasi 1979, A&A, 77, 93. Bologna at 408 MHz (4'.2 × 110' : $S = 30 \pm 30\%$).

G156.2 + 5.7

RA: 04^h54^m40^s
Dec: +51°47'

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

Size/arcmin: 110
Type: S

Radio: Faint shell.

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' : $S = 4.2 \pm 1.0$) and 2.7 GHz (4'.3 : $S = 3.0 \pm 1.0$), plus HI and IRAS.

Yamauchi *et al.* 1993, PASJ, 45, 795. Hard X-ray observations.

G160.9 + 2.6

HB9

RA: 04^h57^m00^s
Dec: +46°36'

1-GHz flux/Jy: 110
Spectral index: 0.6

Size/arcmin: 140 × 120
Type: S

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, JA&A, 3, 207. Radio observations at 34.5 MHz (26' × 40' : $S = 750 \pm 150$), plus review of flux densities.

van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source.

Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.

Reich *et al.* 1983, in IAU101, p377. Effelsberg 100-m at 2.7 GHz (4'.5).

Krymkin *et al.* 1988, SvA, 32, 634. Observations at 12.6 and 25 MHz, plus review of flux densities.

Leahy 1988, ApJ, 322, 917. IPC observations.

Leahy & Roger, 1991, AJ, 101, 1033. DRAO at 408 MHz (3'.5 × 4'.8) and 1.4 GHz (1'.0 × 1'.4), including HI and discussion of distance.

Yamauchi & Koyama 1993, PASJ, 45, 545. Hard X-ray observations.

Leahy & Aschenbach 1995, A&A, 293, 853. ROSAT observations.

G166.0 + 4.3

VRO 42.05.01

RA: 05^h23^m00^s
Dec: +42°52'

1-GHz flux/Jy: 7?
Spectral index: 0.4?

Size/arcmin: 55 × 35
Type: S

Radio: Two arcs of strikingly different radii.

Optical: Nearly complete ring.

X-ray: Predominantly in SW.

Distance: HI indicates 4.5 kpc.

References:

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5' : $S = 5.2 \pm 1.0$).

Lozinskaya 1979, AuJPh, 32, 113. H α interferometry.

Landecker *et al.* 1982, ApJ, 261, L41. DRAO at 1.4 GHz (1'.0 × 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'' × 20'') of part of remnant, and optical.

Pineault *et al.* 1987, ApJ, 315, 580. DRAO and VLA combined at 1.4 GHz (20'').

Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.

Braun & Strom 1986, A&AS, 63, 345. WSRT HI Observations.

Landecker *et al.* 1989, MNRAS, 237, 277. DRAO at 1.4 GHz (1'.0 × 1'.4), including HI.

Burrows & Guo 1994, ApJ, 421, L19. ROSAT images and spectra.

G166.2 + 2.5		OA 184
RA: 05 ^h 15 ^m 30 ^s	1-GHz flux/Jy: 11	Size/arcmin: 90 × 70
Dec: +41°50′	Spectral index: 0.5	Type: S

Radio: Large, faint shell.
Optical: Nearly complete ring.
Distance: HI indicates 8 ± 2 kpc.

References:
 Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ($5' : S = 6.0 \pm 2.2$).
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo 111 MHz.
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
 Routledge *et al.* 1986, MNRAS, 221, 809. DRAO at 1.4 GHz ($1' \times 1'.4 : S = 9.0 \pm 0.5$) including HI, plus review of flux densities.
 Kim *et al.* 1988, AJ, 96, 704. VLA of background sources for magnetic field structure of the remnant.
 Leahy & Marshall 1988, MNRAS, 235, 805. IRAS observations.

G179.0 + 2.6		
RA: 05 ^h 50 ^m 30 ^s	1-GHz flux/Jy: 7	Size/arcmin: 70
Dec: +31°05′	Spectral index: 0.4	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.

G180.0 - 1.7		S147
RA: 05 ^h 36 ^m 00 ^s	1-GHz flux/Jy: 65	Size/arcmin: 180
Dec: +27°50′	Spectral index: varies	Type: S

Radio: Large faint shell, with spectral break.
Optical: Wispy ring.
X-ray: Possible detection.
Point sources: Pulsar within boundary.

References:
 van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
 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 ($5'.5 : S = 34.9 \pm 4$) and 1.6 GHz ($10' : S = 60.2 \pm 6$).
 Angerhofer & Kundu 1981, AJ, 86, 1003. Arecibo at 430 MHz ($9' : S = 97 \pm 20$).
 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, 186. 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.
 Anderson *et al.* 1996, ApJ, 468, L55. Pulsar detection.

G184.6 – 5.8

Crab Nebula, 3C144, SN1054

RA: 05^h31^m30^s**1-GHz flux/Jy:** 1040**Size/arcmin:** 7 × 5**Dec:** +21°59′**Spectral index:** 0.30**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 polarized filaments, diffuse synchrotron emission, with “jet” faintly visible.

X-ray: Centrally brightened around the pulsar.

Point sources: Pulsar powering the remnant.

Distance: Proper motions and radial velocities give 2 kpc.

References:

- Trimble & Woltjer 1971, ApJ, 163, L97. Optical expansion for distance.
 Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz (58'' : $S = 499.3 \pm 1.0$).
 Clark *et al.* 1983, MNRAS, 204, 415. 3-D optical structure.
 Velusamy 1984, Nat, 308, 251. VLA at 1.4 GHz, radio detection of “jet”.
 Harnden & Seward 1984, ApJ, 283, 279. X-ray observations.
 Velusamy 1985, MNRAS, 212, 359. VLA at 1.4 GHz (15'').
 Aller & Reynolds 1985, ApJ, 293, L73. Flux density decrease.
 Mezger *et al.* 1986, A&A, 167, 145. 249-GHz map (120'').
 Fesen & Gull 1986, ApJ, 306, 259. Deep [OIII] imagery of “jet”.
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (26''.5 : $S < 417$).
 Romani *et al.* 1990, ApJ, 347, L51. HI and IR of surroundings.
 Marcellin *et al.* 1990, A&A, 228, 471. Optical of “jet”.
 Fesen & Blair 1990, ApJ, 351, L45. Optical identification of dust in filaments.
 Hester *et al.* 1990, ApJ, 357, 539. Optical and IR images.
 Graham *et al.* 1990, ApJ, 352, 172. IR spectroscopy and imaging.
 Hickson & van den Bergh 1990, ApJ, 365, 224. Optical polarization.
 Bietenholz & Kronberg 1990, ApJ, 357, L13. VLA at 1.4 GHz (1''.8).
 MacAlpine & Uomoto 1991, AJ, 102, 218. Photometry.
 Michel *et al.* 1991, ApJ, 368, 463. Optical photometry.
 Bietenholz *et al.* 1991, ApJ, 373, L59. VLA at multiple epochs for expansion studies.
 Véron-Cetty & Woltjer 1991, A&A, 251, L31. Limits on optical variations.
 Hennessy *et al.* 1992, ApJ, 395, L13. UV imagery.
 Fesen *et al.* 1992, ApJ, 399, 599. Optical studies of “dark bays”.
 Blair *et al.* 1992, ApJ, 399, 611. Far UV observations.
 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.
 Strom & Greidanus 1992, Nat, 358, 654. IRAS observations.
 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.
 Nolan *et al.* 1993, ApJ, 409, 697. Gamma ray observations.
 Strong *et al.* 1993, A&AS, 97, 133. Gamma ray observations
 Murdin 1994, MNRAS, 269, 89. Deep H α plates and spectroscopy of halo.
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.
 MacAlpine *et al.* 1994, ApJ, 432, L131. Prominent optical knots.
 Rudy *et al.* 1994, ApJ, 426, 646. IR spectroscopy.
 Tanimori *et al.* 1994, ApJ, 429, L61. Gamma rays from pulsar.
 Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.
 Lawrence *et al.* 1995, AJ, 109, 2635. Optical imaging spectroscopy.
 Frail *et al.* 1995, ApJ, 454, L129. VLA at 333 MHz (20'') for limits on shell.
 MacAlpine *et al.* 1996, ApJ, 463, 650. Optical spectroscopy of N and S rich filaments.

G189.1 + 3.0

IC443, 3C157

RA: 06^h14^m00^s**1-GHz flux/Jy:** 160**Size/arcmin:** 45**Dec:** +22°36′**Spectral index:** 0.36**Type:** S**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.**Distance:** Mean optical velocity suggests 0.7–1.5 kpc, association with S249 gives 1.5–2 kpc.**References:**

- Duin & van der Laan 1975, A&A, 40, 111. WSRT at 610 MHz ($1' \times 2'.5$), 1415 MHz ($24'' \times 63''$), and part at 5 GHz ($12'' \times 31''$).
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
 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 ($13' \times 11'$ to $5'.4 \times 4'.7$), plus review of flux densities.
 Braun & Strom 1986, A&A, 164, 193. WSRT at 327 MHz ($72'' \times 185''$) and 1.4 GHz ($17'' \times 43''$), plus HI and IRAS.
 Green 1986, MNRAS, 221, 473. CLFST at 151 MHz ($1'.2 \times 3'.1$) and HMT at 1.4 GHz ($2'.1 \times 5'.4$).
 Mufson *et al.* 1986, AJ, 92, 1349. Radio, IR, optical, UV and X-ray comparison, including VLA at 1.6 GHz ($3''.8 \times 3''.3$ and $40''$).
 White *et al.* 1987, A&A, 173, 337. Observations of shocked molecular species.
 Graham *et al.* 1987, ApJ, 313, 847. IR spectroscopy.
 Burton *et al.* 1988, MNRAS, 231, 617. Molecular hydrogen imaging of shocked material.
 Brown *et al.* 1988, ApJ, 334, 852. [FeX] optical imaging.
 Dickel *et al.* 1989, AJ, 98, 1363. VLA at 1.4 GHz ($1''.1 \times 1''.2$) of NE.
 Petre *et al.* 1988, ApJ, 335, 215. IPC, HRI, SSS and other X-ray observations.
 Ziurys *et al.* 1989, ApJ, 341, 857. Observations of shocked molecular species.
 Burton *et al.* 1990, ApJ, 355, 197. IR observations of shocked O₂.
 Sauvageot *et al.* 1990, A&A, 232, 203. [FeX] and [FeXIV] imaging.
 Moorhouse *et al.* 1991, MNRAS, 253, 662. Observations of shocked molecular H₂.
 Wood *et al.* 1991, AJ, 102, 224. VLA at 5 GHz ($3''.6 \times 3''.8$) of northeast, including polarization.
 Teske 1991, ApJ, 383, 233. [FeX] and [FeXIV] imaging.
 Wang & Scoville 1992, ApJ, 386, 158. Observations of shocked molecular species.
 Wang *et al.* 1992, PASJ, 44, 303. Ginga X-ray observations.
 Turner *et al.* 1992, ApJ, 399, 114. Observations of shocked molecular species.
 Dickman *et al.* 1992, ApJ, 400, 203. Observations of shocked molecular species.
 Inoue *et al.* 1993, PASJ, 45, 539. Observations of shocked molecular H₂.
 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.
 White 1994, A&A, 283, L25. Observations of shocked molecular species.
 Tauber *et al.* 1994, ApJ, 421, 570. Observations of shocked molecular species.
 Richter *et al.* 1995, ApJ, 454, 277. Observations of shocked molecular H₂.
 Esposito *et al.* 1996, ApJ, 461, 820. Associated gamma-ray emission.
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.

G192.8 – 1.1

PKS 0607+17

RA: 06^h06^m30^s**1-GHz flux/Jy:** 20?**Size/arcmin:** 78**Dec:** +17°20′**Spectral index:** 0.6?**Type:** S

Has been called G193.3–1.5. Has been regarded as part of the Origen 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 ($9' : S = 13 \pm 15\%$).
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 318 MHz ($15' : S = 74 \pm 32$), and $S(610) = 40$.
 Caswell 1985, AJ, 90, 1076. DRAO at 1.4 GHz ($1' \times 3'.3 : S = 18 \pm 3$).

G205.5 + 0.5		Monoceros Nebula
RA: 06 ^h 36 ^m 00 ^s	1-GHz flux/Jy: 160	Size/arcmin: 220
Dec: +06°30'	Spectral index: 0.5	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' : $S = 462 \pm 180$) and $S(610) = 245$.
 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 : $S = 97.6 \pm 12.5$), plus review of flux densities.
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
 Leahy *et al.* 1986, MNRAS, 220, 501. IPC 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.

G206.9 + 2.3		PKS 0646+06
RA: 06 ^h 46 ^m 00 ^s	1-GHz flux/Jy: 6	Size/arcmin: 60 × 40
Dec: +06°30'	Spectral index: 0.5	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.
 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 : $S = 4.1 \pm 0.6$), plus review of flux densities.
 Rosado 1982, RMxAA, 5, 127. Optical.
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
 Leahy *et al.* 1986, MNRAS, 220, 501. IPC observations.
 Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz (24', 19' and 16').

G211.7 - 1.1		
RA: 06 ^h 43 ^m 10 ^s	1-GHz flux/Jy: 15?	Size/arcmin: 70?
Dec: +00°24'	Spectral index: 0.5?	Type: S?

Radio: Non-thermal source hinted by Bologna survey.
Optical: Coincides with S284, filamentary ring with brighter central area.
References:
 Bonsignori-Facondi & Tomasi 1979, A&A, 77, 93. Bologna at 408 MHz (4'.2 × 110' : $S = 23 \pm 20\%$).

G260.4 – 3.4		Puppis A, MSH 08–44
RA: 08 ^h 20 ^m 30 ^s	1-GHz flux/Jy: 130	Size/arcmin: 60 × 50
Dec: –42°50′	Spectral index: 0.5	Type: S

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 compact X-ray source.
Distance: Association with HI gives 2.2 ± 0.3 kpc.
References:
 Green 1971, AuJPh, 24, 773. Molonglo at 408 MHz ($3' : S = 198 \pm 20$).
 Goudis & Meaburn 1978, A&A, 62, 283. H α +NII] optical image.
 Winkler *et al.* 1981, ApJ, 245, 574. FPCS, Oxygen lines.
 Winkler *et al.* 1981, ApJ, 245, L27. X-ray spectrum.
 Petre *et al.* 1982, ApJ, 258, 22. HRI 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. HI and CO observations of surroundings.
 Arendt *et al.* 1990, ApJ, 350, 266. MOST at 843 MHz ($44'' \times 65''$), with large scale emission added, plus IR, optical and X-ray observations.
 Dubner *et al.* 1991, AJ, 101, 1466. VLA at 327 MHz ($43'' \times 73''$) and 1.5 GHz ($43'' \times 77''$).
 Arendt *et al.* 1991, ApJ, 368, 474. IR observations.
 Milne *et al.* 1993, MNRAS, 261, 366. Parkes 64-m at 4.75 ($4'.5 : S = 59 \pm 5$) and 8.4 GHz ($3' : S = 38 \pm 4$), plus polarization.
 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.

G261.9 + 5.5		
RA: 09 ^h 02 ^m 20 ^s	1-GHz flux/Jy: 10?	Size/arcmin: 40 × 30
Dec: –38°30′	Spectral index: 0.4?	Type: S

Radio: Faint shell with little limb brightening.

References:

Hill 1967, AuJPh, 20, 297. Parkes 64-m at 2650 MHz ($7'.5 : S = 7$) also $S(1410) = 8$, $S(81.5) = 25$.
 Colomb & Dubner 1980, A&A, 82, 244. Argentine 30-m dish at 1.4 GHz, for HI possibly associated with remnant.
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 71''$).

G263.9 – 3.3

RA: 08^h32^m30^s
Dec: –45°35′

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.

Radio: Large shell, with flatter spectrum component (Vela X).

Optical: Filaments.

X-ray: Patchy shell, with extensions, central nebula and pulsar.

Point sources: Pulsar within Vela X.

Distance: Vela pulsar implies 0.5 kpc.

References:

Milne 1968, AuJPh, 21, 201. Parkes 64-m at various frequencies, including 408 MHz (48′ : $S = 2300 \pm 300$), 635 MHz (31′ : $S = 2360 \pm 300$), 1410 MHz (14′ : $S = 1640 \pm 300$) and 2650 MHz (7.5′ : $S = 1400 \pm 250$), plus discussion of the distance.

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.

Dopita *et al.* 1977, ApJ, 214, 179. Optical spectroscopy.

Hearn *et al.* 1980, ApJ, 235, L67. X-ray map.

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. Clarify notation of this region and review previous observations.

Kahn *et al.* 1985, ApJ, 299, 821. IPC observations.

Harnden *et al.* 1985, ApJ, 299, 828. IPC and HRI observations of Vela X and pulsar.

Bignami & Caraveo 1988, ApJ, 325, L5. Pulsar proper motion from optical observations.

Dwarakanath 1991, JA&A, 12, 199. Gauribidanur ‘T’ array at 34.5 MHz (26′ × 84′ : $S = 1800$ for Vela X and $S = 3900$ for Vela YZ), plus review of flux densities.

Bietenholz *et al.* 1991, ApJ, 376, L41. VLA at 5 GHz in vicinity of pulsar.

Raymond *et al.* 1991, ApJ, 383, 226. UV spectroscopy.

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_I.

Oberlack *et al.* 1994, ApJS, 92, 433. Gamma ray observations.

Bocchino *et al.* 1994, ApJ, 437, 209. ROSAT observations of NE.

Aschenbach *et al.* 1995, Nat, 373, 587. ROSAT of X-ray extensions.

Strom *et al.* 1995, Nat, 373, 590. Radio of X-ray extensions.

Markwardt & Ögelman 1995, Nat, 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 polarization, of Vela X.

Duncan *et al.* 1996, MNRAS, 280, 252. Parkes 64-m at 2.4 GHz (8′.9).

Danks & Sembach 1995, AJ, 109, 2627. Optical spectroscopy of background stars.

de Jager *et al.* 1996, ApJ, 460, 729. Gamma ray detection.

Blair *et al.* 1995, AJ, 110, 312. UV spectroscopy.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″) of part.

G272.2 – 3.2

RA: 09^h05^m15^s
Dec: –51°50′

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

Size/arcmin: 15?
Type: S?

Radio: Not detected (as is near Vela).

X-ray: Centrally brightened.

Optical: Detected.

References:

Greiner *et al.* 1994, A&A, 286, L35. ROSAT observations, plus optical.

G279.0 + 1.1

RA: 09^h56^m00^s
Dec: –53°00′

1-GHz flux/Jy: 30?
Spectral index: 0.6?

Size/arcmin: 95
Type: S

Radio: Faint, incomplete shell.

Point sources: Pulsar nearby.

References:

Woermann & Jonas 1988, MNRAS, 234, 971. Hartesbeesthoek 26-m at 1.6 (30′ : $S = 25.2 \pm 4$) and 2.3 GHz (20′ : $S = 20.7 \pm 3$).
 Duncan *et al.* 1995, MNRAS, 277, 319. Parkes 64-m at 1.4 (18′ : $S = 28 \pm 3$) and 2.4 GHz (11′ : $S = 20 \pm 2$), including polarization.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 53″) of part.

G284.3 – 1.8

RA: 10^h16^m30^s
Dec: –58°45′

1-GHz flux/Jy: 11?
Spectral index: 0.3?

MSH 10–53
Size/arcmin: 24?
Type: S

Radio: Incomplete, poorly defined shell.

References:

Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43″ × 50″) and Parkes 64-m at 8.4 GHz (3′ : $S = 5.4 \pm 0.8$) including polarization, plus earlier flux densities.

G286.5 – 1.2

RA: 10^h33^m50^s
Dec: –59°26′

1-GHz flux/Jy: 1.4?
Spectral index: ?

Size/arcmin: 26 × 6
Type: S?

Radio: Double, elongated arc.

References:

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ : $S = 1.6$).

G289.7 – 0.3

RA: 10^h59^m10^s
Dec: –60°02′

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″ : $S = 6.4 \pm 0.5$), plus Parkes 64-m at 4.5 GHz ($S = 7.5 \pm 2.5$) and 8.55 GHz ($S = 3.6 \pm 0.9$).

G290.1 – 0.8

RA: 11^h01^m00^s
Dec: –60°40′

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: Detected.

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 : $S = 20.2$).
 Elliot & Malin 1979, MNRAS, 186, 45P. Optical image and spectra.
 Kirshner & Winkler 1979, ApJ, 227, 853. Optical.
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 50″).
 Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43″ × 49″ : $S = 45 \pm 11$), and Parkes 64-m at 8.4 GHz (3′ : $S = 19.5 \pm 1.0$), including polarization.
 Seward 1990, ApJS, 73, 781. IPC observations.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : $S = 43$).

G291.0 – 0.1

(MSH 11–62)

RA: 11^h09^m45^s**1-GHz flux/Jy:** 16**Size/arcmin:** 15 × 13**Dec:** –60°22′**Spectral index:** 0.29**Type:** C?**Radio:** Centrally brightened core, with surrounding arcs.**X-ray:** Centrally brightened.**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″ : $S = 17.2 \pm 1.0$), and Parkes 64-m at 5 and 8.4 GHz (4′.6 and 3′ : $S = 10.4 \pm 0.4$ and $9′.1 \pm 0.2$), with polarization.

Wilson 1986, ApJ, 302, 718. IPC observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : $S = 12.7$).**G292.0 + 1.8**

MSH 11–54

RA: 11^h22^m20^s**1-GHz flux/Jy:** 15**Size/arcmin:** 12 × 8**Dec:** –59°00′**Spectral index:** 0.4**Type:** C?**Radio:** Centrally brightened source surrounded by a plateau of faint emission.**Optical:** Oxygen rich.**X-ray:** Ring of emission.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).

Goss *et al.* 1979, MNRAS, 188, 357. Optical spectra.Lockhart *et al.* 1977, MNRAS, 179, 147. Fleurs at 1415 MHz (50″ : $S = 13.0$).Clark *et al.* 1980, MNRAS, 193, 129. SSS spectrum.Tuohy *et al.* 1982, ApJ, 260, L65. HRI 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.

G293.8 + 0.6**RA:** 11^h32^m40^s**1-GHz flux/Jy:** 5?**Size/arcmin:** 20**Dec:** –60°37′**Spectral index:** 0.6?**Type:** C**Radio:** Central source, with faint extended plateau.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 9.0$) and Parkes 64-m at 5 GHz (4′ : $S = 2.1$).

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″ : $S = 2.6$).**G294.1 – 0.0****RA:** 11^h33^m50^s**1-GHz flux/Jy:** >2?**Size/arcmin:** 40**Dec:** –61°22′**Spectral index:** ?**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^h48^m40^s
Dec: –62°17′

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: Detected.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 6.9$) and Parkes 64-m at 5 GHz (4′ : $S > 0.74$) poor 5-GHz map (of G296.1–0.7).
 Longmore *et al.* 1977, MNRAS, 181, 541. Optical spectra.
 van den Bergh 1978, ApJS, 38, 119. Optical.
 Markert *et al.* 1981, ApJ, 248, L17. IPC observations.
 Caswell & Barnes 1983, ApJ, 271, L55. Molonglo at 408 MHz (3′ : $S = 12.4$).
 Bignami *et al.* 1986, ApJ, 302, 606. EXOSAT, IPC and HRI observations.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : $S > 2.4$).

G296.5 + 10.0

RA: 12^h07^m00^s
Dec: –52°10′

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 compact source.

Point sources: Compact X-ray source detected within the remnant.

References:

Irvine & Irvine 1974, ApJ, 192, L111. Optical.
 Danziger & Dennefeld 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. IPC and HRI 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 : $S = 33 \pm 3$), 4.8 GHz (4′.5 : $S = 23.3 \pm 3$) and 8.4 GHz (3′.0 : 18.8 ± 3), including polarization and review of flux densities.
 Mereghetti *et al.* 1996, ApJ, 464, 842. Radio, optical and X-ray observations of central source.

G296.8 – 0.3

RA: 11^h56^m00^s
Dec: –62°18′

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

1156–62
Size/arcmin: 20 × 14
Type: S

Radio: Shell, brighter to the NW.

References:

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 15.0$) and Parkes 64-m at 5 GHz (4′ : $S = 3.2$).
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : $S = 9.2$).

G298.5 – 0.3

RA: 12^h10^m00^s
Dec: –62°35'

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'' : $S = 1.8$).

G298.6 – 0.0

RA: 12^h11^m00^s
Dec: –62°20'

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'' : $S = 7.4$).

G299.2 – 2.9

RA: 12^h12^m30^s
Dec: –65°13'

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

Size/arcmin: 18 × 11
Type: S

Radio: Faint source.

X-ray: Centrally brightened.

Optical: Filaments in W.

References:

Bussler *et al.* 1996, A&A, 310, L1. ROSAT detection, plus optical studies.

G299.6 – 0.5

RA: 12^h19^m00^s
Dec: –62°52'

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'' : $S = 1.1$).

G301.4 – 1.0

RA: 12^h35^m00^s
Dec: –63°33'

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'' : $S = 2.3$).

G302.3 + 0.7

RA: 12^h42^m55^s
Dec: –61°52'

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' : $S = 7.5$) and Parkes 64-m at 5 GHz (4' : $S = 3.0$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 49'' : $S = 3.2$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G304.6 + 0.1

Kes 17

RA: 13^h02^m50^s
Dec: -62°26'**1-GHz flux/Jy:** 14
Spectral index: 0.5**Size/arcmin:** 8
Type: S**Radio:** Incomplete shell.**Distance:** Possible limit of > 9.7 kpc from HI 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).
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 48'' : S = 18).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G308.1 - 0.7**RA:** 13^h34^m10^s
Dec: -62°49'**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).

G308.8 - 0.1**RA:** 13^h39^m00^s
Dec: -62°08'**1-GHz flux/Jy:** 15?
Spectral index: 0.4?**Size/arcmin:** 20 × 30?
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) and Parkes 64-m at 5 GHz (4' : S = 7.0).
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4'.4 : S = 6.5).
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50'').
 Wilson 1986, ApJ, 302, 718. Lack of detection with IPC.
 Caswell *et al.* 1992, ApJ, 399, L151. MOST at 843 MHz (43'' × 49'').
 Kaspi *et al.* 1992, ApJ, 399, L155. Pulsar observations.

G309.2 - 0.6**RA:** 13^h43^m00^s
Dec: -62°39'**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.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3' : S = 10.0) and Parkes 64-m at 5 GHz (4' : S = 3.9).
 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).

G309.8 + 0.0**RA:** 13^h47^m00^s
Dec: -61°50'**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) and Parkes 64-m at 5 GHz (4' : S = 7.4).
 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).

G310.6 – 0.3		Kes 20B
RA: 14 ^h 01 ^m 40 ^s	1-GHz flux/Jy: 5?	Size/arcmin: 8
Dec: –62°23′	Spectral index: ?	Type: S

Radio: Asymmetric shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 49'' : $S = 5.4$).

G310.8 – 0.4		Kes 20A
RA: 14 ^h 03 ^m 40 ^s	1-GHz flux/Jy: 6?	Size/arcmin: 12
Dec: –62°31′	Spectral index: ?	Type: S

Radio: Arc in E, in complex region.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 49'' : $S = 6.9$).

G311.5 – 0.3		
RA: 14 ^h 02 ^m 00 ^s	1-GHz flux/Jy: 3?	Size/arcmin: 5
Dec: –61°44′	Spectral index: 0.5	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'' : $S = 2.9$).

G312.4 – 0.4		
RA: 14 ^h 09 ^m 20 ^s	1-GHz flux/Jy: 45	Size/arcmin: 38
Dec: –61°29′	Spectral index: 0.36	Type: S

Radio: Irregular, incomplete shell.

References:
Caswell & Barnes 1985, MNRAS, 216, 753. Molonglo at 408 MHz (3' : $S = 56$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 49'' : $S > 19$), plus Parkes 64-m at 4.5 GHz ($S = 30 \pm 2$)
and 8.55 GHz ($S = 17 \pm 4$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G315.4 – 2.3

RCW 86, MSH 14–63

RA: 14^h39^m00^s
Dec: –62°17′**1-GHz flux/Jy:** 49
Spectral index: 0.6**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 bright patch.**Distance:** Possible association with OB stars suggests 2.5 kpc.**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 86$) and Parkes 64-m at 5 GHz (4′ : $S = 18.2$).
 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. IPC and HRI observations
 Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum.
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 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, Nat, 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″ × 48″ : $S > 22$).

G315.4 – 0.3**RA:** 14^h32^m10^s
Dec: –60°23′**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.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 15.9$) and Parkes 64-m at 5 GHz (4′ : $S = 4.9$).
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50″ : $S = 6.25$), re-assessment of earlier flux densities.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : $S = 3.1$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G315.9 – 0.0**RA:** 14^h42^m20^s
Dec: –60°24′**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 steep-spectrum “jet”?**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″ : $S = 0.9$).

G316.3 – 0.0

(MSH 14–57)

RA: 14^h37^m40^s
Dec: –59°47′**1-GHz flux/Jy:** 20?
Spectral index: 0.4**Size/arcmin:** 29 × 14
Type: S**Radio:** Distorted shell, with possible “blowout”.**Distance:** HI 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 HI absorption.
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 : $S = 16.7$).
 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″ : $S = 20$).

G317.3 - 0.2**RA:** 14^h45^m50^s**1-GHz flux/Jy:** 4.7?**Size/arcmin:** 11**Dec:** -59°34'**Spectral index:** ?**Type:** S**Radio:** Incomplete shell.**References:**Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 50'' : $S = 5.2$).**G318.2 + 0.1****RA:** 14^h51^m00^s**1-GHz flux/Jy:** >3.9?**Size/arcmin:** 40 × 35**Dec:** -58°51'**Spectral index:** ?**Type:** S**Radio:** Faint shell, with central HII region.**References:**Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 50'' : $S > 4.3$).**G318.9 + 0.4****RA:** 14^h54^m40^s**1-GHz flux/Jy:** 4?**Size/arcmin:** 30 × 14**Dec:** -58°17'**Spectral index:** 0.2?**Type:** C

May not be a SNR?

Radio: Complex arcs, with off-centre core.**References:**

Whiteoak 1990, Nat, 347, 157. MOST at 843 MHz (43'' × 51'').

Whiteoak 1993, ApJ, 415, 701. MOST at 843 MHz (43'' × 51'' : $S = 4.8 \pm 0.6$), Parkes 64-m at 4.5 GHz (4'.7 : $S = 3.7 \pm 0.2$) and 8.4 GHz (2'.8 : $S = 3.0 \pm 0.4$) including polarization, 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'' : $S = 4.8$).

G320.4 – 1.2

MSH 15–52, RCW 89

RA: 15^h10^m30^s**1-GHz flux/Jy:** 60?**Size/arcmin:** 35**Dec:** –58°58′**Spectral index:** 0.4**Type:** C

Has been suggested as the remnant of the SN of AD185?

Radio: Ragged shell.

Optical: RCW 89 is the H α emitting region to the NW.

X-ray: Partial shell, central nebula and pulsar and possible “jet”.

Point sources: Radio and X-ray pulsar, plus IR compact source.

Distance: HI absorption indicates 4.2 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 of pulsar.

Manchester *et al.* 1982, ApJ, 262, L31. Radio of pulsar.

Seward *et al.* 1983, ApJ, 267, 698. X-ray, Optical and IR.

Kamper & van den Bergh, 1980, ApJ, 280, L51. Optical expansion.

Seward *et al.* 1984, ApJ, 281, 650. X-ray observations of pulsar and nebulosity.

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 : $S = 37 \pm 7$) and 8.4 GHz (3'.0 : $S = 24 \pm 4$) of remnant and nearby large loop, including polarization and review of flux densities.

Strom 1994, MNRAS, 268, L5. Historical association.

Chin & Huang 1994, Nat, 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. HartRAO 26-m at 2.3, 5 and 8.5 GHz ($S = 42, 35.6, 14.5$).

Greiveldinga *et al.* 1995, ApJ, 454, 855. ROSAT observations.

Trassoni *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" \times 50" : $S = 62$).

G320.6 – 1.6**RA:** 15^h21^m50^s**1-GHz flux/Jy:** ?**Size/arcmin:** 60 \times 30**Dec:** –59°27′**Spectral index:** ?**Type:** S

Radio: Faint shell, overlapping G320.4–1.2 in W.

References:

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43" \times 50" : $S > 9.3$).

G321.9 – 1.1**RA:** 15^h19^m50^s**1-GHz flux/Jy:** >3.4?**Size/arcmin:** 28**Dec:** –58°02′**Spectral index:** ?**Type:** S

Radio: Faint shell.

References:

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43" \times 51" : $S > 3.8$).

G321.9 – 0.3

RA: $15^{\text{h}}16^{\text{m}}45^{\text{s}}$
Dec: $-57^{\circ}23'$

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 ($3' : S = 18.3$) and Parkes 64-m at 5 GHz ($4' : S = 7.8$).

Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 52''$).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 51'' : S > 8.3$).

G322.5 – 0.1

RA: $15^{\text{h}}19^{\text{m}}30^{\text{s}}$
Dec: $-56^{\circ}55'$

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 ($43'' \times 51'' : S = 2.0 \pm 0.3$).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 51'' : S = 1.7$), plus Parkes 64-m at 4.5 GHz ($= 0.89 \pm 0.13$).

G323.5 + 0.1

RA: $15^{\text{h}}24^{\text{m}}50^{\text{s}}$
Dec: $-56^{\circ}11'$

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 ($3' : S = 4.2$) and Parkes 64-m at 5 GHz ($4' : S = 1.5$).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 52'' : S = 4.2$).

G326.3 – 1.8

RA: $15^{\text{h}}49^{\text{m}}00^{\text{s}}$
Dec: $-56^{\circ}00'$

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 flat spectrum core.

Optical: Emission around the shell.

X-ray: Shell, with central extended emission.

References:

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ($3' : S = 180$).

Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.

Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz ($0'.8 : S > 95$) and Parkes 64-m at 14.7 GHz ($2'.2 : S = 69 \pm 8$).

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 ($44'' \times 53''$).

Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz ($43'' \times 52'' : S = 153 \pm 40$), and Parkes 64-m at 8.4 GHz ($3' : S = 68 \pm 5$), including polarization.

Seward 1990, ApJS, 73, 781. IPC observations.

Kassim *et al.* 1993, ApJ, 419, 733. ROSAT image.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 52'' : S > 130$).

G327.1 – 1.1

RA: 15^h50^m30^s
Dec: –55°00′

1-GHz flux/Jy: 7?
Spectral index: ?

Size/arcmin: 18
Type: C

Radio: Shell, with off-centre core.

X-ray: Detected.

References:

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8'.4 : $S = 10 \pm 15\%$).

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3' : $S = 10.6$) and Parkes 64-m at 5 GHz (4' : $S = 4.3$).

Lamb & Markert 1981, ApJ, 244, 94. IPC observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 52'' : $S = 7.6$).

G327.4 + 0.4

Kes 27

RA: 15^h44^m30^s
Dec: –53°40′

1-GHz flux/Jy: 30?
Spectral index: 0.6

Size/arcmin: 21
Type: S

Has been called G327.3+0.4 and G327.3+0.5.

Radio: Incomplete, multi-arc shell, brightest to the SE.

X-ray: Compact and extended emission near centre of remnant.

References:

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3' : $S = 5.8$) and Parkes 64-m at 5 GHz (4' : $S = 12.4$).

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. IPC observations.

Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44'' × 55'').

Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43'' × 53'' : $S = 32.2 \pm 6$), and Parkes 64-m at 8.4 GHz (3' : $S = 9.4 \pm 0.8$), including polarization.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 53'' : $S = 25$).

G327.4 + 1.0

RA: 15^h43^m00^s
Dec: –53°11′

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'' : $S = 2.1$).

G327.6 + 14.6

SN1006, PKS 1459–41

RA: 14^h59^m35^s**1-GHz flux/Jy:** 19**Size/arcmin:** 30**Dec:** –41°44′**Spectral index:** 0.6**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 α component.

X-ray: Thermal shell, with non-thermal limb-brightened arcs.

Point sources: The Schweizer-Middleditch star is near the middle of the remnant.

Distance: Optical spectra and proper motion indicate 1.7–3.1 kpc.

References:

- van den Bergh 1976, ApJ, 208, L17. Optical.
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).
 Pskovskii 1978, SvA, 22, 420. Distance from historical records.
 Becker *et al.* 1980, ApJ, 240, L33. SSS and other X-ray spectra.
 Schweizer & Middleditch 1980, ApJ, 241, 1039. Possible stellar remnant.
 Pye *et al.* 1981, MNRAS, 194, 569. IPC 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'' \times 20'').
 Kirshner *et al.* 1987, ApJ, 315, L135. Broad H α optical component.
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44'' \times 66'').
 Fesen *et al.* 1988, ApJ, 327, 164. UV absorption spectra to the Schweizer-Middleditch star.
 Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44'' \times 66'' : $S = 17.5 \pm 1.5$).
 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.
 Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.
 Reynolds & Gilmore 1993, AJ, 106, 272. VLA at 1.37 and 1.67 GHz (24''), including polarization.
 Moffett *et al.* 1993, AJ, 106, 1566. VLA at 1.37 and 1.67 GHz (10'' \times 14''), for proper motion studies.
 Raymond *et al.* 1995, ApJ, 454, L31. Far UV spectroscopy.
 Koyama *et al.* 1995, Nat, 378, 255. ASCA observations.
 Willingale *et al.* 1996, MNRAS, 278, 749. ROSAT observations.

G328.4 + 0.2

(MSH 15–57)

RA: 15^h51^m40^s**1-GHz flux/Jy:** 16?**Size/arcmin:** 6**Dec:** –53°08′**Spectral index:** 0.2**Type:** F

Radio: Amorphous emission.

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 IPC.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' \times 54'' : $S = 15$).

G329.7 + 0.4**RA:** 15^h57^m30^s**1-GHz flux/Jy:** >34?**Size/arcmin:** 40 \times 33**Dec:** –52°11′**Spectral index:** ?**Type:** S

Radio: Diffuse shell, in complex region.

References:

- Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' \times 53'' : $S > 38$).

G330.0 + 15.0		Lupus Loop
RA: 15 ^h 05 ^m 00 ^s	1-GHz flux/Jy: 350?	Size/arcmin: 180?
Dec: –39°30′	Spectral index: 0.5?	Type: S

Radio: Low surface brightness loop with HI shell.
X-ray: Detected.
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 : $S = 120 \pm 30\%$).
 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.

G330.2 + 1.0		
RA: 15 ^h 57 ^m 20 ^s	1-GHz flux/Jy: 5?	Size/arcmin: 11
Dec: –51°26′	Spectral index: 0.3	Type: S?

Radio: Clumpy non-thermal emission, possibly a distorted shell.
References:
 Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 8.6$) and Parkes 64-m at 5 GHz (4′ : $S = 4.0$).
 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″ : $S = 4.7$).

G332.0 + 0.2		
RA: 16 ^h 09 ^m 30 ^s	1-GHz flux/Jy: 8?	Size/arcmin: 12
Dec: –50°45′	Spectral index: 0.5	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″ : $S = 8.9$).

G332.4 – 0.4		RCW 103
RA: 16 ^h 13 ^m 45 ^s	1-GHz flux/Jy: 28	Size/arcmin: 10
Dec: –50°55′	Spectral index: 0.5	Type: S

Radio: Shell, brightest to the S.
Optical: Filaments correspond well to the radio shell.
X-ray: Detected, with point source near centre.
Point sources: Detected in X-rays.
Distance: HI absorption indicates 3.3 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.
 Tuohy & Garmire 1980, ApJ, 239, L107. HRI detection of X-ray point source.
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50″).
 Lamb & Markert 1981, ApJ, 244, 94. IPC 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 HRI 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 polarization.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 55″ : $S = 34$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G332.4 + 0.1

MSH 16–51, Kes 32

RA: 16^h11^m30^s**1-GHz flux/Jy:** 26**Size/arcmin:** 15**Dec:** –50°35′**Spectral index:** 0.5**Type:** S

Has been called G332.4+0.2.

Radio: Distorted shell, with thermal jet and plume adjacent.**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, Nat, 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″ : $S = 29$).Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.**G335.2 + 0.1****RA:** 16^h24^m00^s**1-GHz flux/Jy:** 16**Size/arcmin:** 21**Dec:** –48°40′**Spectral index:** 0.5**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′ : $S = 27.1$) and Parkes 64-m at 5 GHz (4′ : $S = 8.6$).Kaspi *et al.* 1996, AJ, 111, 2028. Pulsar observations.Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 57″ : $S = 16$).**G336.7 + 0.5****RA:** 16^h28^m30^s**1-GHz flux/Jy:** 6**Size/arcmin:** 14 × 10**Dec:** –47°13′**Spectral index:** 0.5**Type:** S**Radio:** Irregular 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″ × 60″).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ : $S = 6.1$).**G337.0 – 0.1**

(CTB 33)

RA: 16^h32^m10^s**1-GHz flux/Jy:** 17?**Size/arcmin:** 13 × 7?**Dec:** –47°27′**Spectral index:** 0.5?**Type:** S?**Radio:** Possible shell, confused by nearby thermal sources.**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″ : $S = 21$).Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).**G337.2 – 0.7****RA:** 16^h35^m45^s**1-GHz flux/Jy:** 2?**Size/arcmin:** 6**Dec:** –47°45′**Spectral index:** 0.7**Type:** S**Radio:** Shell, not well resolved.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 3.8$) and Parkes 64-m at 5 GHz (4′ : $S = 0.70$).Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ : $S = 2.0$).

G337.3 + 1.0

Kes 40

RA: 16^h29^m00^s
Dec: -46°30'**1-GHz flux/Jy:** 16
Spectral index: 0.55**Size/arcmin:** 15 × 12
Type: S**Radio:** Nearly complete shell.**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3' : $S = 24.6$) and Parkes 64-m at 5 GHz (4' : $S = 7.2$).
 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, PASAu, 8, 187. MOST at 843 MHz (43'' × 59'' : $S = 14.8 \pm 3.0$), and Parkes 64-m at 8.4 GHz (3' : $S = 5.1 \pm 0.6$), including polarization.
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 59'' : $S = 20$).

G337.8 - 0.1

Kes 41

RA: 16^h35^m20^s
Dec: -46°53'**1-GHz flux/Jy:** 18
Spectral index: 0.5**Size/arcmin:** 9 × 6
Type: S**Radio:** Distorted shell.**Distance:** HI absorption suggests > 9.3 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'' : $S = 18$).

G338.1 + 0.4**RA:** 16^h34^m20^s
Dec: -46°18'**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.**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'' : $S = 3.8$).

G338.3 - 0.0**RA:** 16^h37^m20^s
Dec: -46°28'**1-GHz flux/Jy:** 7?
Spectral index: ?**Size/arcmin:** 8
Type: S**Radio:** Irregular shell, in complex region.**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'' : $S = 7.4$).

G338.5 + 0.1**RA:** 16^h37^m30^s
Dec: -46°13'**1-GHz flux/Jy:** 12?
Spectral index: ?**Size/arcmin:** 9
Type: ?**Radio:** Circle of non-thermal emission in complex region, not well defined.**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'' : $S = 13$).

G340.4 + 0.4

RA: $16^{\text{h}}42^{\text{m}}55^{\text{s}}$
Dec: $-44^{\circ}34'$

1-GHz flux/Jy: 5
Spectral index: 0.4

Size/arcmin: 10×7
Type: S

Radio: Distorted shell, elongated east-west.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3'$: $S = 8.2$) and Parkes 64-m at 5 GHz ($4'$: $S = 2.9$).
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz ($50''$).
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz ($75'' \times 48''$: $S = 9.8 \pm 0.9$) and 1.4 GHz ($27'' \times 9''$: $S = 3.6 \pm 0.1$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 61''$: $S = 5.9$).

G340.6 + 0.3

RA: $16^{\text{h}}44^{\text{m}}05^{\text{s}}$
Dec: $-44^{\circ}29'$

1-GHz flux/Jy: 5?
Spectral index: 0.4?

Size/arcmin: 6
Type: S

Radio: Incomplete shell.

Optical: Possible associated filaments.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3'$: $S = 7.0$) and Parkes 64-m at 5 GHz ($4'$: $S = 2.8$).
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz ($50''$).
 Zealey *et al.* 1979, A&AS, 38, 39. Optical.
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz ($75'' \times 48''$: $S = 9.2 \pm 0.9$) and 1.4 GHz ($27'' \times 9''$: $S = 5.8 \pm 0.1$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 61''$: $S = 4.5$).

G341.2 + 0.9

RA: $16^{\text{h}}44^{\text{m}}00^{\text{s}}$
Dec: $-43^{\circ}42'$

1-GHz flux/Jy: 1.5?
Spectral index: 0.6?

Size/arcmin: 16×22
Type: C?

Radio: Incomplete shell, with extension to SW.

Point sources: Pulsar in W.

References:

Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz ($54'' \times 116''$: $S = 3.0 \pm 0.1$) and 1.4 GHz ($21'' \times 25''$: $S = 12.5 \pm 0.05$).

G341.9 - 0.3

RA: $16^{\text{h}}51^{\text{m}}25^{\text{s}}$
Dec: $-43^{\circ}56'$

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 ($3'$: $S = 7.4$) and Parkes 64-m at 5 GHz ($4'$: $S = 1.7$), see Caswell & Clark 1975, AuJPA, 37, 57 for the maps.
 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 ($35'' \times 11''$: $S = 2.2 \pm 0.1$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 62''$: $S = 2.7$).

G342.0 - 0.2

RA: $16^{\text{h}}51^{\text{m}}15^{\text{s}}$
Dec: $-43^{\circ}48'$

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 $S(408) = 5$, $S(5000) = 2$ from previous maps.
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz ($35'' \times 11''$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 62''$: $S = 3.5$).

G342.1 + 0.9

RA: $16^{\text{h}}47^{\text{m}}10^{\text{s}}$
Dec: $-42^{\circ}59'$

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 ($43'' \times 63''$: $S = 0.6$).

G343.1 - 2.3

RA: $17^{\text{h}}04^{\text{m}}25^{\text{s}}$
Dec: $-44^{\circ}12'$

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

Size/arcmin: 32?
Type: C?

Radio: Incomplete shell?

Point sources: Pulsar near edge.

References:

McAdam *et al.* 1993, Nat, 361, 516. MOST at 843 MHz (smoothed to $2'$).

Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz ($56'' \times 111''$: $S = 10.6$) and 1.4 GHz ($22'' \times 27''$) near pulsar.

Becker *et al.* 1995, A&A, 298, 528. ROSAT of pulsar, and limit for remnant.

G343.1 - 0.7

RA: $16^{\text{h}}56^{\text{m}}50^{\text{s}}$
Dec: $-43^{\circ}10'$

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 ($43'' \times 63''$: $S = 8.5 \pm 0.6$), plus Parkes 64-m at 4.5 GHz ($S = 3.9 \pm 0.6$) and 8.55 GHz ($S = 2.4 \pm 0.5$)

G344.7 - 0.1

RA: $17^{\text{h}}00^{\text{m}}20^{\text{s}}$
Dec: $-41^{\circ}38'$

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

Size/arcmin: 10
Type: C?

Radio: Aysmmetric shell, with possible core.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3'$: $S = 4.7$) and Parkes 64-m at 5 GHz ($4'$: $S = 1.3$).

Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($30'' \times 43''$: $S = 1.7 \pm 0.1$).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 65''$: $S = 2.5$).

G345.7 - 0.2

RA: $17^{\text{h}}03^{\text{m}}50^{\text{s}}$
Dec: $-40^{\circ}49'$

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 ($43'' \times 66''$: $S = 0.7$).

G346.6 - 0.2

RA: $17^{\text{h}}06^{\text{m}}50^{\text{s}}$
Dec: $-40^{\circ}07'$

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

Size/arcmin: 8
Type: S

Radio: Irregular shell.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3'$: $S = 14.9$) and Parkes 64-m at 5 GHz ($4'$: $S = 4.3$).

Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($31'' \times 43''$: $S = 8.1 \pm 0.9$).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 67''$: $S = 8.7$).

G348.5 – 0.0

RA: $17^{\text{h}}12^{\text{m}}00^{\text{s}}$
Dec: $-38^{\circ}25'$

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 ($46'' \times 53''$), 1.4 GHz ($18'' \times 33''$) and part at 5 GHz ($2''.5 \times 3''.9$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 69'' : S = 10.2$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G348.5 + 0.1

RA: $17^{\text{h}}10^{\text{m}}40^{\text{s}}$
Dec: $-38^{\circ}29'$

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.

Distance: HI absorption indicates 10.2 ± 3.5 kpc.

References:

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ($3' : S = 97$).
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz ($4'.4 : S = 43$).
 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 ($2'.2 : S = 18 \pm 5$).
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz ($20'' \times 45''$).
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz ($46'' \times 53''$), 1.4 GHz ($18'' \times 33''$) and part at 5 GHz ($2''.5 \times 3''.9$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 69'' : S = 71$).

G348.7 + 0.3

RA: $17^{\text{h}}10^{\text{m}}30^{\text{s}}$
Dec: $-38^{\circ}08'$

1-GHz flux/Jy: 26
Spectral index: 0.3

CTB 37B
Size/arcmin: 17?
Type: S

Radio: Incomplete shell with faint eastern extensions.

Distance: HI absorption indicates 10.2 ± 3.5 kpc.

References:

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ($3' : S = 34$).
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz ($4'.4 : S = 32$).
 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 ($2'.2 : S = 8 \pm 3$).
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz ($20'' \times 45''$).
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz ($46'' \times 53''$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 69'' : S = 33$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G349.2 – 0.1

RA: $17^{\text{h}}13^{\text{m}}50^{\text{s}}$
Dec: $-38^{\circ}01'$

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 ($43'' \times 70'' : S = 1.6$).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G349.7 + 0.2

RA: 17^h14^m35^s
Dec: -37°23'

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.

Distance: HI absorption indicates 18.3±4.6 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) and Parkes 64-m at 5 GHz (4' : S = 9.1), no maps.
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.
 Shaver *et al.* 1985, Nat, 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).
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G350.0 - 1.8

RA: 17^h23^m40^s
Dec: -38°20'

1-GHz flux/Jy: 31
Spectral index: 0.5

Size/arcmin: 30?
Type: S?

Radio: Arc, possibly part of a larger remnant.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3' : S = 49.5) and Parkes 64-m at 5 GHz (4' : S = 13.6).
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4'.4).

G351.2 + 0.1

RA: 17^h19^m05^s
Dec: -36°08'

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) and Parkes 64-m at 5 GHz (4' : S = 3.1).
 Caswell *et al.* 1984, PASAu, 5, 227. MOST at 843 MHz (43'' × 77'').
 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 ± 0.2).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 73'' : S = 5.5).

G351.7 + 0.8

RA: 17^h17^m40^s
Dec: -35°24'

1-GHz flux/Jy: 10?
Spectral index: ?

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).

G351.9 - 0.9

RA: 17^h25^m30^s
Dec: -36°14'

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).

G352.7 – 0.1

RA: 17^h24^m20^s
Dec: –35°05′

1-GHz flux/Jy: 4
Spectral index: 0.6

Size/arcmin: 8 × 6
Type: S

Radio: Distorted shell.

References:

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 9.6$) and Parkes 64-m at 5 GHz (4′ : $S = 2.3$).
 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″ : $S = 3.4 \pm 0.4$).
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 75″ : $S = 4.4$).

G354.1 + 0.1

RA: 17^h27^m10^s
Dec: –33°44′

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^h32^m40^s
Dec: –33°40′

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″ : $S = 3.1$).

G355.6 – 0.0

RA: 17^h32^m00^s
Dec: –32°36′

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

Size/arcmin: 6 × 8
Type: S

Radio: Well defined shell.

References:

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″ × 80″ : $S = 2.6$).

G355.9 – 2.5

RA: 17^h42^m35^s
Dec: –33°42′

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′ : $S = 12.3$) and Parkes 64-m at 5 GHz (4′ : $S = 3.4$).
 Caswell *et al.* 1984, PASAu, 5, 227. MOST at 843 MHz (43″ × 77″).
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (32″ × 34″ : $S = 5.0 \pm 0.3$).
 Gray 1994, MNRAS, 270, 836. MOST at 843 MHz (43″ × 77″).

G356.3 – 0.3

RA: 17^h34^m40^s
Dec: –32°14′

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

Size/arcmin: 7 × 11
Type: S

Radio: Elongated shell, brighter in N.

References:

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43″ × 81″ : $S = 2.6$).

G356.3 – 1.5

RA: 17^h39^m20^s
Dec: –32°51′

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

Size/arcmin: 15 × 20
Type: S

Radio: Double arc.

References:

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz (43'' × 79'' : $S = 2.8$).

G357.7 – 0.1

RA: 17^h37^m15^s
Dec: –30°56′

1-GHz flux/Jy: 37
Spectral index: 0.4

MSH 17–39
Size/arcmin: 3 × 8?
Type: ?

Has been suggested that this is not a SNR.

Radio: Multiple arcs and filaments.

Point sources: Peripheral compact source (a compact HII region?).

References:

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3' : $S = 54.2$) and Parkes 64-m at 5 GHz (4' : $S = 18.5$).

Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4'.4 : $S = 14.6$).

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, Nat, 313, 113. VLA at 1.4 GHz (3''.8 × 10''.9) and 5 GHz (12'' × 26'').

Becker & Helfand 1985, Nat, 313, 115. VLA at 1.4 GHz and 5 GHz, suggest it is not a SNR, see Helfand & Becker 1985 Nat, 313, 118.

Shaver *et al.* 1985, A&A, 147, L23. Observations of peripheral compact source.

Caswell *et al.* 1989, PASAu, 8, 184. MOST at 843 MHz (43'' × 83'').

Gray 1994, MNRAS, 270, 836. 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 polarization.

Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G357.7 + 0.3

RA: 17^h35^m20^s
Dec: –30°42′

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 : $S = 7 \pm 1.5$), $S(5000) = 5.5 \pm 1.5$ from surveys.

Gray 1994, MNRAS, 270, 836. MOST at 843 MHz (43'' × 84'').

G359.0 – 0.9

RA: 17^h43^m35^s
Dec: –30°15′

1-GHz flux/Jy: 23
Spectral index: 0.5

Size/arcmin: 23
Type: S

Radio: Incomplete shell.

References:

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.

Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

Gray 1994, MNRAS, 270, 836. MOST at 843 MHz (43'' × 86'').

G359.1 – 0.5**RA:** 17^h42^m20^s**1-GHz flux/Jy:** 14**Size/arcmin:** 24**Dec:** –29°56′**Spectral index:** 0.4?**Type:** S**Radio:** Non-thermal shell in complex region, crossed by the “snake”.**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 ($2'.6 : S = 13$).Reich & Fürst 1984, A&AS, 57, 165. Effelsberg 100-m at 2.7 GHz ($4'.3 : S = 10 \pm 1.5$) and 4.8 GHz ($2'.4 : S = 8.1 \pm 0.5$).Uchida *et al.* 1992, ApJ, 398, 128. VLA at 1.5 GHz ($11'' \times 10''$), and observations of nearby molecular material.Uchida *et al.* 1992, AJ, 104, 1533. VLA at 1.4 GHz.Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ($43'' \times 85''$).Yusef-Zadeh *et al.* 1995, Sci, 270, 1801. VLA at 1.4 GHz ($33'' \times 31''$), and 1.7 GHz for OH survey.**G359.1 + 0.9****RA:** 17^h36^m25^s**1-GHz flux/Jy:** 5?**Size/arcmin:** 11 × 12**Dec:** –29°09′**Spectral index:** ?**Type:** S**Radio:** Shell, brightest in E.**References:**Gray 1994, MNRAS, 270, 847. MOST at 843 MHz ($43'' \times 88'' : S = 4.3$).