

# A Catalogue of Galactic Supernova Remnants

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## The Catalogue Format

This catalogue of Galactic supernova remnants (SNRs) is an updated version of those presented in detail in Green (1984, 1988) and in summary form in Green (1991) (hereafter Papers I, II, and III respectively). This version contains 182 SNRs (which is 8 more than in the summary catalogue of Paper III and 26 more than in the detailed catalogue of Paper II), with nearly two hundred more references in the detailed listings than in Paper II. For each remnant in the catalogue the following parameters are given:

- **Galactic Coordinates** of the source centroid quoted to the nearest tenth of a degree as is conventional.
- **Other Names** that are commonly used for the object. These are given in parentheses if the remnant is only a part of the source.
- **Right Ascension and Declination** of the source centroid. The accuracy of the quoted values depends on the size of the remnant; for small remnants they are to the nearest few seconds of time and the nearest minute of arc respectively, whereas for larger remnants they are rounded to coarser values, but are in every case sufficient to specify a point within the boundary of the remnant. These coordinates are deduced from radio maps rather than from X-ray or optical observations, and are for B1950.0.

- **Angular Size** of the remnant, in arcminutes, usually taken from the highest resolution radio map available, although for some barely resolved sources that are thought to be SNRs the only available size is that from Gaussian models after deconvolution with the observed beam size. The boundary of most remnants approximates reasonably well to a circle or an ellipse; a single value is quoted for the angular size of the more nearly circular remnants, which is the diameter of a circle with an area equal to that of the remnant, but for elongated remnants the product of two values is quoted, and these are the major and minor axes of the remnant boundary modelled as an ellipse. In a few cases an ellipse is not a satisfactory description of the boundary of the object (refer to the description of the individual object given in its catalogue entry), although an angular size is still quoted for information. For 'filled-centre' remnants the size quoted is for the largest extent of the observed radio emission, not, as at times has been used, the half-width of the centrally brightened peak.
- **Flux Density** of the remnant at 1 GHz in jansky. This is *not* a measured value, but that deduced from the observed radio frequency spectrum of the source. The frequency of 1 GHz is chosen because flux density measurements at frequencies both above and below this value are usually available.
- **Spectral Index** of the integrated radio emission from the remnant,  $\alpha$  (here defined in the sense,  $S \propto \nu^{-\alpha}$ , where  $S$  is the flux density at a frequency  $\nu$ ), either a value that is quoted in the literature, or one deduced from the available integrated flux densities of the remnant. For several SNRs a simple spectral model is not adequate to describe their radio emission because there is evidence that the spectral index varies across the face of the remnant or that the integrated spectrum is curved, and in these cases the spectral index is given as 'varies' (refer to the description of the remnant and recent references in the catalogue entry for more information). In a few cases, where the remnant is highly confused with thermal emission, the spectral index is given as '?' since no value can be deduced with any confidence.
- **Type of the SNR**, either 'S', 'F' or 'C' if the remnant shows a 'shell', 'filled-centre' or 'composite' (or 'combination') radio structure (or 'S?', 'F?' or 'C?', respectively, if there is some uncertainty), or '?' in several cases where an object is conventionally regarded as an SNR even though its nature is poorly known or not well understood.

Then, for each remnant, notes on a variety of topics are given. First, it is noted if other Galactic coordinates have at times been used to label it (usually before good observations have revealed the full extent of the object), if the SNR is thought to be the remnant of a historical SN, or if the nature of the source as an SNR has been questioned (in which case an appropriate reference is usually given later in the entry). Brief descriptions of the remnant from the available radio, optical and X-ray observations as applicable are then given, together with notes on available distance determinations, and any point sources or pulsars in the field of the object (although they may not necessarily be related to the remnant). Finally, appropriate references are given for each remnant, complete with journal, volume, page, and a short description of what information each paper contains (for radio observations these include the telescopes used, the observing frequencies and resolutions, together with any flux density determinations). These references are *not* complete, but cover representative and recent observations of the remnant, and they should themselves include references to earlier work. The references do not generally include large observational surveys — of particular interest in this respect are: the Effelsberg 100-m survey at 2.7 GHz of the Galactic plane  $358^\circ < l < 240^\circ$ ,  $|b| < 5^\circ$  by Reich *et al.* (1990) and Fürst *et al.* (1990); the review of *Einstein* X-ray imaging and *FPCS* observations of Galactic SNRs by Seward (1990) and Lum *et al.* (1992) respectively; the survey of *IRAS* observations of SNRs and their immediate surroundings by Arendt (1989) and by Saken, Fesen & Shull (1992); and the survey of HI emission towards SNRs by Koo & Heiles (1991).

A summary of the data available for all 182 remnants in the catalogue is given in Table I. SNRs often called by names other than their Galactic coordinates are listed alphabetically in Table II, and the abbreviations for journals, proceedings and telescopes (both radio and X-ray) used here are listed in Table III. The detailed listings for each SNR are given in Table IV.

## Revisions and Notes

### *Objects no longer thought to be SNRs*

The following objects, which were listed in the catalogue in Paper I, have been removed from the catalogue because they are no longer thought to be remnants, or are poorly observed (see Paper II for references and further details): G2.4+1.4, G41.9-4.1 (=CTB 73, PKS 1920+06), G47.6+6.1 (=CTB 63), G53.9+0.3 (part of HC40), G93.4+1.8 (=NRAO 655), G123.2+2.9, G194.7+0.4 (the Origen Loop), G287.8-0.5, G322.3-1.2 (=Kes 24) and G343.0-6.0.

G350.1-0.3, which was listed in the catalogue in Paper II, was removed as it is no longer thought to be a SNR (see Paper III for details). No objects listed in the catalogue in Paper III have since been removed.

The following objects, which have been reported as SNRs, but have not been included in any of SNR catalogues, have subsequently been shown not to be SNRs:

- G70.7+1.2 which was reported as a SNR by Reich *et al.* (1985), but this has not been confirmed by subsequent observations (see Green 1986; de Muizon *et al.* 1988; Becker & Fesen 1988; Caswell 1988; Bally *et al.* 1989).
- G81.6+1.0 a possible SNR in W75 reported by Ward-Thompson & Robson (1991) is instead a thermal source, because of its thermal radio spectrum, and high infrared-to-radio emission (see the observations in Wendker, Higgs & Landecker 1991).
- Green & Gull (1984) suggested that G227.1+1.0 as a very young SNR, but subsequent observations (Channan *et al.* 1986; Green & Gull 1986) have shown that this is most likely an extragalactic source, not an SNR.
- a candidate SNR, G274.7-2.8, identified by Helfand & Channan (1989), has been shown not to be a SNR by Caswell & Stewart (1991).
- G25.5+0.2, which was reported as a very young SNR by Cowan *et al.* (1990), although this identification was not certain (see White & Becker 1990; Green 1990; Zijlstra 1991). Sramek *et al.* (1992) report the detection of recombination lines from this source.
- Most of the possible SNRs listed by Gorham (1990) have been shown not to be SNRs by Gorham *et al.* (1993).

Some entries in the catalogue have been renamed, due to improved observations revealing a larger true extent for the object (G5.3-1.0 is now G5.4-1.2; G193.3-1.5 is now G192.8-1.1; G308.7+0.0 is now G308.8-0.1).

### *New SNRs*

The following new remnants were added to the catalogue of Paper II: G0.9+0.1, G1.9+0.3, G5.9+3.1, G6.4+4.0, G8.7-0.1, G16.8-1.1, G18.9-1.1, G20.0-0.2, G27.8+0.6, G30.7+1.0, G31.5-0.6, G36.6-0.7, G42.8+0.6, G45.7-0.4, G54.1+0.3, G73.9+0.9, G179.0+2.6, G312.4-0.4, G357.7+0.3 and G359.1-0.9.

The following new remnants were added to the catalogue of Paper III: G4.2-3.5, G5.2-2.6, G6.1+1.2, G8.7-5.0, G13.5+0.2, G15.1-1.6, G16.7+0.1, G17.4-2.3, G17.8-2.6, G30.7-2.0, G36.6+2.6, G43.9+1.6, G59.8+1.2, G65.1+0.6, G68.6-1.2, G69.7+1.0, G279.0+1.1, G284.3-1.8 (=MSH 10-53), G358.4-1.9 and G359.0-0.9.

Since Paper III, the following SNRs have been added to the catalogue:

- Three new remnants (G59.5+0.1, G67.7+1.8 and G84.9+0.5) of the the eleven possible SNRs reported by Taylor, Wallace & Goss (1992).
- G156.2+5.7, which was first identified from X-ray observations by ROSAT (Pfeffermann, Aschenbach & Predehl 1991).
- G318.9+0.4, a complex of radio arcs reported by Whiteoak (1990).
- G322.5-0.1, reported by Whiteoak (1992).
- G343.1-2.3, an incomplete radio shell, with an associated pulsar (McAdam, Osborne & Parkinson 1993).
- G348.5-0.0, a radio arc near G348.5+0.1 (=CTB 37A), revealed by Kassim, Baum & Weiler (1991).

### *Possible SNRs not listed in the catalogue*

The following are possible SNRs for which further observations are required to confirm their nature.

- Eight possible remnants (G45.9–0.1, G55.2+0.5, G63.7+1.1, G71.6–0.5, G72.2–0.3, G76.9+0.9, G83.0–0.2 and G85.2–1.2) of the the eleven reported by Taylor *et al.* (1992).
- G287.6–0.6 and G343.0–6.0 — both of which were listed in Paper I as SNRs but have been removed from the catalogue because only limited observations are available — should be considered as possible SNRs (see Tateyama, Strauss & Kaufmann 1991 for G287.6–0.6).
- G284.2–1.8 (=MSH 10–53), which was listed in early SNR catalogues, but subsequently rejected because of its apparent thermal spectrum (see Paper II for details). Ruiz & May (1986) report optical and CO radio observations that indicate the presence of shock-excited material, supporting the SNR identification, although the parameters of any SNR are not well defined.
- A possible SNR within the Puppis A remnant (Winkler *et al.* 1989).
- G300.1+9.4, a possible SNR reported by Dubner, Colomb & Giacani (1986).
- G203.2–12.3, a filamentary optical ring identified as a SNR by Winkler & Reipurth (1992).
- G315.8–0.0, a possible ‘shell’ SNR with a remarkable collimated ‘jet’ of radio emission, reported by Kesteven *et al.* (1987), although this source has an unusually steep spectrum (with  $\alpha \approx 1$ ).
- A possible SNR near  $l = 32^\circ$  reported by Thompson, Djorgovski & Decarvalho (1991).
- A faint, poorly defined possible remnant G41.1+1.2 reported by Gorham *et al.* (1993).
- A possible large SNR in Lupus near  $l = 347^\circ$ ,  $b = 22^\circ$  (Reigler, Agrawal & Gull 1980; Colomb, Dubner & Giacani 1984).
- G1.0–0.1, a possible SNR near the Galactic centre reported by Downes *et al.* (1978).
- G75.5+2.4, a possible old SNR in Cygnus (Nichols-Bohlin & Fesen 1993).

Other possible SNRs are reported by Ho *et al.* (1985), Gosachinskiĭ (1985), Odegard (1986), Fürst, Reich & Sofue (1987), Routledge & Vaneldik (1988), Kassim (1988), Helfand *et al.* (1989), Meaburn *et al.* (1991), Leahy, Nousek & Garmire (1992), and Dubner *et al.* (1992).

Finally, it should be noted that some radio loops in the Galactic plane (see Berkhuijsen 1973) may be parts of very large, old SNRs, but they have not been included in the catalogue.

### *Questionable SNRs listed in the catalogue*

As noted in Paper II, the following sources are listed in the catalogue as SNRs, although, as discussed in each case, the identifications are not certain: G5.4–1.2, G39.7–2.0 (=W50), G65.7+1.2 (=DA 495), G69.0+2.7 (=CTB 80), G357.7–0.1. The nature of G318.9+0.4 is also uncertain (see Whiteoak 1990).

There are also many objects that have been identified as SNRs and are listed in the catalogue, although they have been barely resolved in the available observations, or are faint, and have not been well separated from confusing background or nearby thermal emission, and their identification as SNRs, or at least their parameters remain uncertain (see Paper II).

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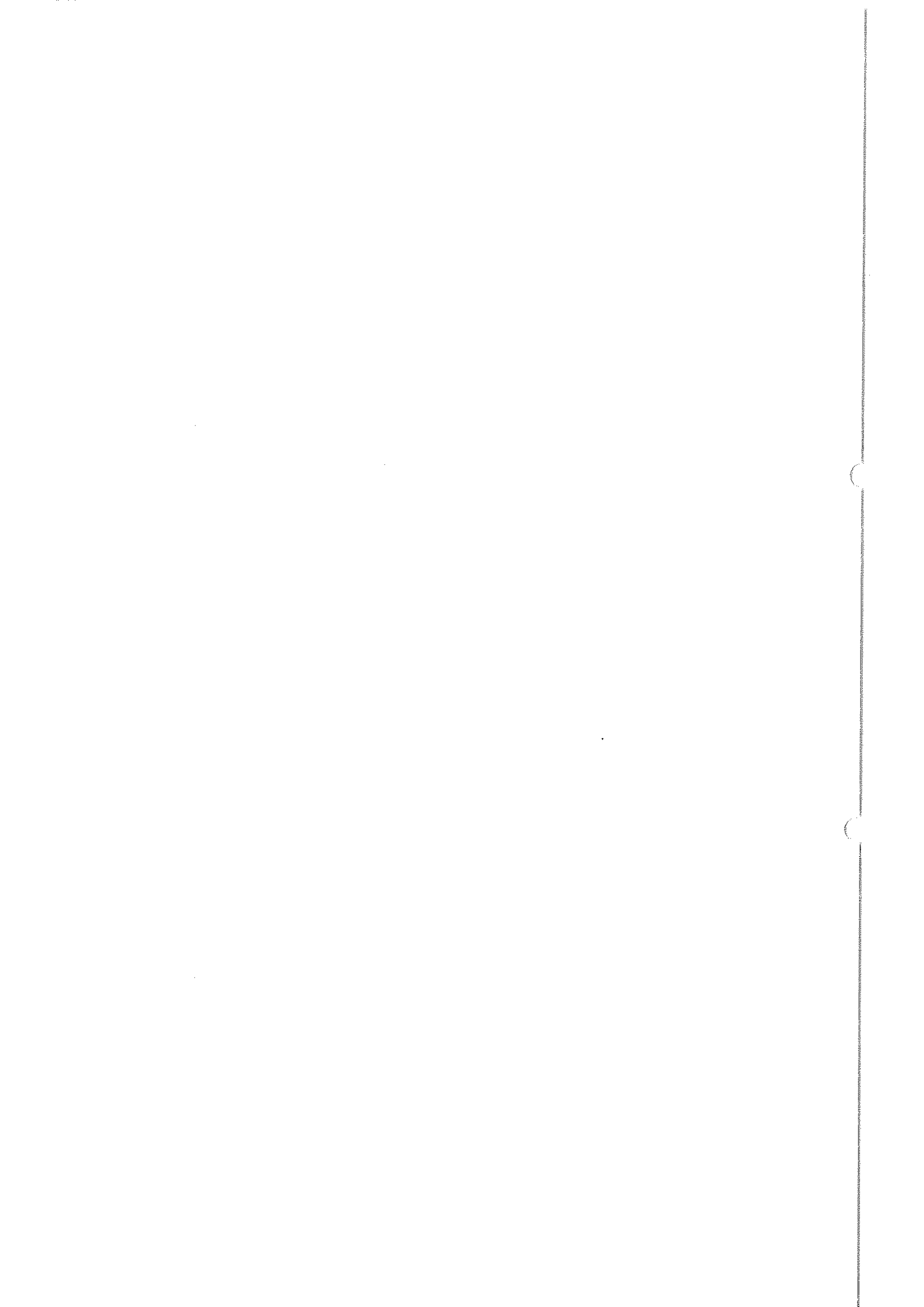


Table I

<i>l</i>	<i>b</i>	RA (1950.0) (h m s)	Dec (° ')	size (arcmin)	type	Flux at 1 GHz (Jy)	spectral index	other names
0.0	+0.0	17 42 33	-28 59	3.5 × 2.5	S	100?	0.8?	Sgr A East
0.9	+0.1	17 44 12	-28 08	8	C	18?	varies	
1.9	+0.3	17 45 37	-27 09	1.2	S	0.6	0.7	
4.2	-3.5	18 05 45	-27 04	28	S	3.2?	0.6?	
4.5	+6.8	17 27 42	-21 27	3	S	19	0.64	Kepler, SN1604, 3C358
5.2	-2.6	18 04 25	-25 45	18	S	2.6?	0.6?	
5.4	-1.2	17 59 00	-24 55	35	C?	35?	0.2?	Milne 56
5.9	+3.1	17 44 20	-22 15	20	S	3.3?	0.4?	
6.1	+1.2	17 51 55	-23 05	30 × 26	F	4.0?	0.3?	
6.4	-0.1	17 57 30	-23 25	42	C	310	varies	W28
6.4	+4.0	17 42 10	-21 20	31	S	1.3?	0.4?	
7.7	-3.7	18 14 20	-24 05	18	S	10	0.32	1814-24
8.7	-5.0	18 21 05	-23 50	26	S	4.4	0.3	
8.7	-0.1	18 02 35	-21 25	45	S?	80	0.5	(W30)
9.8	+0.6	18 02 10	-20 14	12	S	3.9	0.5	
10.0	-0.3	18 05 40	-20 26	8?	S?	2.9	0.8	
11.2	-0.3	18 08 30	-19 26	4	S	22	0.49	
11.4	-0.1	18 07 50	-19 06	8	S?	6	0.5	
12.0	-0.1	18 09 15	-18 38	5?	?	3.5	0.7	
13.5	+0.2	18 11 20	-17 13	5 × 4	S	3.5?	1.0?	
15.1	-1.6	18 21 05	-16 36	30 × 24	S	5.5?	0.8?	
15.9	+0.2	18 16 00	-15 03	7 × 5	S?	4.5?	0.7?	
16.7	+0.1	18 18 05	-14 21	4	C	3.0	0.6	
16.8	-1.1	18 22 30	-14 48	30 × 24?	?	2?	?	
17.4	-2.3	18 28 05	-14 54	24?	S	4.8?	0.8?	
17.8	-2.6	18 30 00	-14 41	24	S	4.0?	0.3?	
18.8	+0.3	18 21 10	-12 25	18 × 13	S	27	0.5	Kes 67
18.9	-1.1	18 27 00	-13 00	33	C?	37	varies	
20.0	-0.2	18 25 20	-11 37	10	F	10	0.0	
21.5	-0.9	18 30 47	-10 37	1.2	F	6	0.0	
21.8	-0.6	18 30 00	-10 10	20	S	69	0.5	Kes 69
22.7	-0.2	18 30 30	-09 15	26	S?	33	0.6	
23.3	-0.3	18 32 00	-08 50	27	S	70	0.5	W41
23.6	+0.3	18 30 20	-08 15	10?	?	8?	0.3	
24.7	-0.6	18 36 00	-07 35	15?	S?	8	0.5	
24.7	+0.6	18 31 30	-07 07	30 × 15	C?	20?	0.2?	
27.4	+0.0	18 38 40	-04 59	4	S	6	0.68	4C-04.71
27.8	+0.6	18 37 06	-04 28	50 × 30	F	30	varies	
29.7	-0.3	18 43 48	-03 02	3	C?	10	0.7	Kes 75
30.7	-2.0	18 51 50	-02 58	16	?	0.5?	0.7?	

Table I

<i>l</i>	<i>b</i>	RA (1950.0) Dec (h m s) (° ')	size (arcmin)	type	Flux at 1 GHz (Jy)	spectral index	other names
30.7	+1.0	18 42 10 -01 35	24 × 18	S?	6	0.4	
31.5	-0.6	18 48 35 -01 35	18?	S?	2?	?	
31.9	+0.0	18 46 50 -00 59	5	S	24	0.55	3C391
32.0	-4.9	19 03 00 -03 00	60?	S?	22?	0.5?	3C396.1
32.8	-0.1	18 48 50 -00 12	17	S?	11?	0.2?	Kes 78
33.2	-0.6	18 51 12 -00 05	18	S	5?	varies	
33.6	+0.1	18 50 15 +00 37	10	S	22	0.5	Kes 79, 4C00.70, HC13
34.7	-0.4	18 53 30 +01 18	35 × 27	S	230	0.30	W44, 3C392
36.6	-0.7	18 58 05 +02 52	25?	S?	?	?	
36.6	+2.6	18 46 20 +04 23	17 × 13?	S	0.7?	0.5?	
39.2	-0.3	19 01 40 +05 23	8 × 6	S	18	0.6	3C396, HC24, NRAO 593
39.7	-2.0	19 10 00 +04 50	120 × 60	?	85?	0.7?	W50, SS433
40.5	-0.5	19 04 45 +06 26	22	S	11	0.5	
41.1	-0.3	19 05 08 +07 03	4.5 × 2.5	S	22	0.48	3C397
42.8	+0.6	19 04 55 +09 00	24	S	3?	0.5?	
43.3	-0.2	19 08 44 +09 01	4 × 3	S	38	0.48	W49B
43.9	+1.6	19 03 30 +10 25	60?	F?	8.6?	0.0?	
45.7	-0.4	19 14 05 +11 04	22	S	4.2?	0.4?	
46.8	-0.3	19 15 50 +12 04	17 × 13	S	14	0.42	(HC30)
49.2	-0.7	19 21 30 +14 00	25?	S?	160?	0.3?	(W51)
53.6	-2.2	19 36 30 +17 08	28	S	8	0.6	3C400.2, NRAO 611
54.1	+0.3	19 28 28 +18 46	1.5	F?	0.5	0.1	
54.4	-0.3	19 31 10 +18 50	40	S	28	0.5	(HC40)
55.7	+3.4	19 19 10 +21 38	23	S	1.4	0.6	
57.2	+0.8	19 32 50 +21 50	12?	S?	1.8?	?	(4C21.53)
59.5	+0.1	19 40 25 +23 28	5	S	3?	?	
59.8	+1.2	19 36 50 +24 12	20 × 16?	?	1.6	0.5	
65.1	+0.6	19 52 30 +28 25	90 × 50	S	6	0.6	
65.3	+5.7	19 31 00 +31 05	310 × 240	S?	52?	0.6?	
65.7	+1.2	19 50 10 +29 18	18	?	5.1	0.6	DA 495
67.7	+1.8	19 52 34 +31 21	9	S	1.4	0.3	
68.6	-1.2	20 06 40 +30 28	28 × 25?	?	0.7?	0.0?	
69.0	+2.7	19 51 30 +32 45	80?	?	120?	varies	CTB 80
69.7	+1.0	20 00 45 +32 35	16	S	1.6	0.8	
73.9	+0.9	20 12 20 +36 03	22?	S?	9?	0.3?	
74.0	-8.5	20 49 00 +30 30	230 × 160	S	210	varies	Cygnus Loop
74.9	+1.2	20 14 10 +37 03	8 × 6	F	9	varies	CTB 87
78.2	+2.1	20 19 00 +40 15	60	S	340	0.5	DR4, γ Cygni
82.2	+5.3	20 17 30 +45 20	95 × 65	S	120?	0.5?	W63
84.2	-0.8	20 51 30 +43 16	20 × 16	S	11	0.5	



Table I

<i>l</i>	<i>b</i>	RA (1950.0) (h m s)	Dec (° ')	size (arcmin)	type	Flux at 1 GHz (Jy)	spectral index	other names
84.9	+0.5	20 48 45	+44 42	6	S	0.8	0.4	
89.0	+4.7	20 43 30	+50 25	120 × 90	S	220	0.40	HB21
93.3	+6.9	20 51 00	+55 10	27 × 20	S	9	0.54	DA 530, 4C(T)55.38.1
93.7	-0.2	21 27 45	+50 35	80	S	65	0.3	CTB 104A, DA 551
94.0	+1.0	21 23 10	+51 40	30 × 25	S	15	0.44	3C434.1
109.1	-1.0	22 59 30	+58 37	28	S	20	0.50	CTB 109
111.7	-2.1	23 21 10	+58 32	5	S	2720	0.77	Cassiopeia A, 3C461
112.0	+1.2	23 13 40	+61 30	30?	S?	7?	0.6?	
114.3	+0.3	23 34 45	+61 38	90 × 55	S	6?	0.3?	
116.5	+1.1	23 51 20	+62 58	80 × 60	S	11?	0.8?	
116.9	+0.2	23 56 40	+62 10	34	S	9?	0.5?	CTB 1
117.4	+5.0	23 52 30	+67 30	60 × 80?	S?	30?	0.5?	
119.5	+10.2	00 04 00	+72 30	90?	S	36	0.3	CTA 1
120.1	+1.4	00 22 30	+63 52	8	S	56	0.61	Tycho, 3C10, SN1572
126.2	+1.6	01 18 30	+64 00	70	S?	7	varies	
127.1	+0.5	01 25 00	+62 55	45	S	13	0.6	R5
130.7	+3.1	02 01 55	+64 35	9 × 5	F	33	0.10	3C58, SN1181
132.7	+1.3	02 14 00	+62 30	80	S	45	0.6	HB3
152.2	-1.2	04 05 30	+48 24	110?	S?	16?	0.7?	
156.2	+5.7	04 54 40	+51 47	110	S	5	0.5	
160.9	+2.6	04 57 00	+46 36	140 × 120	S	110	0.6	HB9
166.0	+4.3	05 23 00	+42 52	55 × 35	S	7?	0.4?	VRO 42.05.01
166.2	+2.5	05 15 30	+41 50	90 × 70	S	11	0.5	OA 184
179.0	+2.6	05 50 30	+31 05	70	S?	7	0.4	
180.0	-1.7	05 36 00	+27 50	180	S	65	varies	S147
184.6	-5.8	05 31 30	+21 59	7 × 5	F	1040	0.30	Crab Nebula, 3C144, SN1054
189.1	+3.0	06 14 00	+22 36	45	S	160	0.36	IC443, 3C157
192.8	-1.1	06 06 30	+17 20	78	S	20?	0.6?	PKS 0607+17
205.5	+0.5	06 36 00	+06 30	220	S	160	0.5	Monoceros Nebula
206.9	+2.3	06 46 00	+06 30	60 × 40	S?	6	0.5	PKS 0646+06
211.7	-1.1	06 43 10	+00 24	70?	S?	15?	0.5?	
240.9	-0.9	07 40 30	-25 06	95?	S?	24?	0.1?	
260.4	-3.4	08 20 30	-42 50	60 × 50	S	130	0.5	Puppis A, MSH 08-44
261.9	+5.5	09 02 20	-38 30	40 × 30	S	10?	0.4?	
263.9	-3.3	08 32 30	-45 35	255	C	1750	varies	Vela (XYZ)
279.0	+1.1	09 56 00	-53 00	95	S	30?	0.6?	
284.3	-1.8	10 16 30	-58 45	24?	S	11?	0.3?	MSH 10-53
290.1	-0.8	11 01 00	-60 40	15 × 10	S	42	0.4	MSH 11-61A
291.0	-0.1	11 09 45	-60 22	10	F	16	0.29	(MSH 11-62)
292.0	+1.8	11 22 20	-59 00	12 × 8	C?	15	0.4	MSH 11-54

<i>l</i>	<i>b</i>	RA (1950.0) (h m s)	Dec (° ')	size (arcmin)	type	Flux at 1 GHz (Jy)	spectral index	other names
293.8	+0.6	11 32 40	-60 37	20	C	5.5?	0.6?	
296.1	-0.5	11 48 40	-62 17	33?	S	8?	0.6?	
296.5	+10.0	12 07 00	-52 10	90 × 65	S	48	0.5	PKS 1209-51/52
296.8	-0.3	11 56 00	-62 18	14	S	9	0.6	1156-62
298.5	-0.3	12 10 00	-62 35	5?	?	5	0.4	
298.6	-0.0	12 11 00	-62 20	12 × 8?	S	4.3	0.3	
299.0	+0.2	12 15 00	-62 12	11?	S?	9?	?	
302.3	+0.7	12 42 55	-61 52	15	S	5.5	0.4	
304.6	+0.1	13 02 50	-62 26	8?	S?	14	0.5	Kes 17
308.8	-0.1	13 39 00	-62 08	20 × 30?	C?	15?	0.4?	
309.2	-0.6	13 43 00	-62 39	17 × 13	S	7?	0.4?	
309.8	+0.0	13 47 00	-61 50	24	S	17	0.5	
311.5	-0.3	14 02 00	-61 44	3?	?	3.7	0.5	
312.4	-0.4	14 09 20	-61 29	36 × 27	S	44?	0.3?	
315.4	-2.3	14 39 00	-62 17	40	S	49	0.6	RCW 86, MSH 14-63
315.4	-0.3	14 32 10	-60 23	15 × 10	S	8	0.4	
316.3	-0.0	14 37 40	-59 47	25 × 15	S	24	0.4	(MSH 14-57)
318.9	+0.4	14 54 40	-58 17	30 × 20?	?	3.5?	0.1?	
320.4	-1.2	15 10 30	-58 58	30	C	60?	0.4?	MSH 15-52, RCW 89
321.9	-0.3	15 16 45	-57 23	30 × 20	S	13	0.3	
322.5	-0.1	15 19 30	-56 55	15	C	1.9	0.3?	
323.5	+0.1	15 24 50	-56 11	10?	S	3?	0.4?	
326.3	-1.8	15 49 00	-56 00	36	C	145	varies	MSH 15-56
327.1	-1.1	15 50 30	-55 00	14?	S?	8?	?	
327.4	+0.4	15 44 30	-53 40	20	S	34	0.6	Kes 27
327.6	+14.6	14 59 35	-41 44	30	S	19	0.6	SN1006, PKS 1459-41
328.0	+0.3	15 49 30	-53 20	6?	?	2.4?	0.6?	
328.4	+0.2	15 51 40	-53 08	6	F	16	0.2	(MSH 15-57)
330.0	+15.0	15 05 00	-39 30	180?	S	350?	0.5?	Lupus Loop
330.2	+1.0	15 57 20	-51 26	10	S?	7	0.3	
332.0	+0.2	16 09 30	-50 45	10	S	9	0.5	
332.4	-0.4	16 13 45	-50 55	9	S	28	0.5	RCW 103
332.4	+0.1	16 11 30	-50 35	15	S	26	0.5	MSH 16-51, Kes 32
335.2	+0.1	16 24 00	-48 40	19	S	18	0.5	
336.7	+0.5	16 28 30	-47 13	13 × 10	S	6	0.5	
337.0	-0.1	16 32 10	-47 27	14?	S?	17?	0.5?	(CTB 33)
337.2	-0.7	16 35 45	-47 45	4?	?	2.1	0.7	
337.3	+1.0	16 29 00	-46 30	11	S	16	0.5	Kes 40
337.8	-0.1	16 35 20	-46 53	7?	?	18	0.5	Kes 41
338.1	+0.4	16 34 20	-46 18	12	S	4.5	0.4	

Table I

- V -

Summary listings

<i>l</i>	<i>b</i>	RA (1950.0) (h m s)	Dec (° ')	size (arcmin)	type	Flux at 1 GHz (Jy)	spectral index	other names
338.3	-0.0	16 37 20	-46 28	8?	S?	15?	0.7?	
338.5	+0.1	16 37 30	-46 13	8?	?	28?	0.3?	
340.4	+0.4	16 42 55	-44 34	6	S	6	0.4	
340.6	+0.3	16 44 05	-44 29	5	S	5.1	0.4	
341.9	-0.3	16 51 25	-43 56	6	S	3.2	0.5	
342.0	-0.2	16 51 15	-43 48	11 × 7	S?	3.5?	0.4?	
343.1	-2.3	17 04 30	-44 15	44 × 32?	S	25?	0.5?	
344.7	-0.1	17 00 20	-41 38	8?	S?	3.0	0.5	
346.6	-0.2	17 06 50	-40 07	8	S	10	0.5	
348.5	-0.0	17 12 00	-38 25	10?	S?	10?	0.4?	
348.5	+0.1	17 10 40	-38 29	15	S	72	0.3	CTB 37A
348.7	+0.3	17 10 30	-38 08	10	S	26	0.3	CTB 37B
349.7	+0.2	17 14 35	-37 23	2.5 × 2	S?	20	0.5	
350.0	-1.8	17 23 40	-38 20	30?	S?	31	0.5	
351.2	+0.1	17 19 05	-36 08	7	C	5.8	0.4	
352.7	-0.1	17 24 20	-35 05	6 × 5	S?	6?	0.6?	
355.9	-2.5	17 42 35	-33 42	13	S	8	0.5	
357.7	-0.1	17 37 15	-30 56	3 × 8?	?	37	0.4	MSH 17-39
357.7	+0.3	17 35 20	-30 42	24	S	10	0.4?	
358.4	-1.9	17 46 05	-31 16	40 × 36	S	12.5?	0.5?	
359.0	-0.9	17 43 35	-30 15	23	S	23	0.5	
359.1	-0.5	17 42 20	-29 56	24	S	14	0.4?	

Table II

Other names for SNRs

$\gamma$ Cygni	G78.2 + 2.1	DR4	G78.2 + 2.1	NRAO 593	G39.2 - 0.3
				NRAO 611	G53.6 - 2.2
1156-62	G296.8 - 0.3	HB3	G132.7 + 1.3		
1814-24	G7.7 - 3.7	HB9	G160.9 + 2.6	OA 184	G166.2 + 2.5
		HB21	G89.0 + 4.7		
3C10	G120.1 + 1.4			PKS 0607+17	G192.8 - 1.1
3C58	G130.7 + 3.1	HC13	G33.6 + 0.1	PKS 0646+06	G206.9 + 2.3
3C144	G184.6 - 5.8	HC24	G39.2 - 0.3	PKS 1209-51/52	G296.5 + 10.0
3C157	G189.1 + 3.0	(HC30)	G46.8 - 0.3	PKS 1459-41	G327.6 + 14.6
3C358	G4.5 + 6.8	(HC40)	G54.4 - 0.3		
3C391	G31.9 + 0.0			Puppis A	G260.4 - 3.4
3C392	G34.7 - 0.4	IC443	G189.1 + 3.0		
3C396	G39.2 - 0.3			R5	G127.1 + 0.5
3C396.1	G32.0 - 4.9	Kepler	G4.5 + 6.8		
3C397	G41.1 - 0.3			RCW 86	G315.4 - 2.3
3C400.2	G53.6 - 2.2	Kes 17	G304.6 + 0.1	RCW 89	G320.4 - 1.2
3C434.1	G94.0 + 1.0	Kes 27	G327.4 + 0.4	RCW 103	G332.4 - 0.4
3C461	G111.7 - 2.1	Kes 32	G332.4 + 0.1		
		Kes 40	G337.3 + 1.0	S147	G180.0 - 1.7
4C-04.71	G27.4 + 0.0	Kes 41	G337.8 - 0.1		
4C00.70	G33.6 + 0.1	Kes 67	G18.8 + 0.3	SN1006	G327.6 + 14.6
(4C21.53)	G57.2 + 0.8	Kes 69	G21.8 - 0.6	SN1054	G184.6 - 5.8
4C(T)55.38.1	G93.3 + 6.9	Kes 75	G29.7 - 0.3	SN1181	G130.7 + 3.1
		Kes 78	G32.8 - 0.1	SN1572	G120.1 + 1.4
		Kes 79	G33.6 + 0.1	SN1604	G4.5 + 6.8
CTA 1	G119.5 + 10.2				
		Lupus Loop	G330.0 + 15.0	SS433	G39.7 - 2.0
CTB 1	G116.9 + 0.2				
(CTB 33)	G337.0 - 0.1			Sgr A East	G0.0 + 0.0
CTB 37A	G348.5 + 0.1	MSH 08-44	G260.4 - 3.4		
CTB 37B	G348.7 + 0.3	MSH 10-53	G284.3 - 1.8		
CTB 80	G69.0 + 2.7	MSH 11-54	G292.0 + 1.8	Tycho	G120.1 + 1.4
CTB 87	G74.9 + 1.2	MSH 11-61A	G290.1 - 0.8		
CTB 104A	G93.7 - 0.2	(MSH 11-62)	G291.0 - 0.1	Vela (XYZ)	G263.9 - 3.3
CTB 109	G109.1 - 1.0	(MSH 14-57)	G316.3 - 0.0		
		MSH 14-63	G315.4 - 2.3	VRO 42.05.01	G166.0 + 4.3
Cassiopeia A	G111.7 - 2.1	MSH 15-52	G320.4 - 1.2		
		MSH 15-56	G326.3 - 1.8	W28	G6.4 - 0.1
Crab Nebula	G184.6 - 5.8	(MSH 15-57)	G328.4 + 0.2	(W30)	G8.7 - 0.1
		MSH 16-51	G332.4 + 0.1	W41	G23.3 - 0.3
Cygnus Loop	G74.0 - 8.5	MSH 17-39	G357.7 - 0.1	W44	G34.7 - 0.4
				W49B	G43.3 - 0.2
DA 495	G65.7 + 1.2	Milne 56	G5.4 - 1.2	W50	G39.7 - 2.0
DA 530	G93.3 + 6.9			(W51)	G49.2 - 0.7
DA 551	G93.7 - 0.2	Monoceros Nebula	G205.5 + 0.5	W63	G82.2 + 5.3

**Journals**

AA	Astronomy & Astrophysics
AAS	Astronomy & Astrophysics Supplement
AJ	Astronomical Journal
AJP	Australian Journal of Physics
AJPAS	Australian Journal of Physics Astrophysical Supplement
AL	Astrophysical Letters
ApJ	Astrophysical Journal
ApJS	Astrophysical Journal Supplement
JAA	Journal of Astrophysics & Astronomy
JRASC	Journal of the Royal Astronomical Society of Canada
MN	Monthly Notices of the Royal Astronomical Society
PASA	Proceedings of the Astronomical Society of Australia
PASJ	Publications of the Astronomical Society of Japan
PASP	Publications of the Astronomical Society of the Pacific
RMex	Review of Mexican Astronomy & Astrophysics
SA	Soviet Astronomy
SAL	Soviet Astronomy Letters

**Proceedings**

- IAU101 is *Supernova Remnants and their X-ray Emission*, (IAU Symposium 101), eds Danziger, I.J. & Gorenstein, P., (Reidel, Dordrecht, Holland), 1983.
- SNRISM is *Supernova Remnants and the Interstellar Medium*, (IAU Colloquium 101), eds Roger, R.S. & Landecker, T.L., (Cambridge University Press), 1988.
- Birthevents is *Supernova Shells and their Birth Events*, ed. Kundt, W.R. (Springer-Verlag, Berlin) 1988.

**Telescopes: Radio**

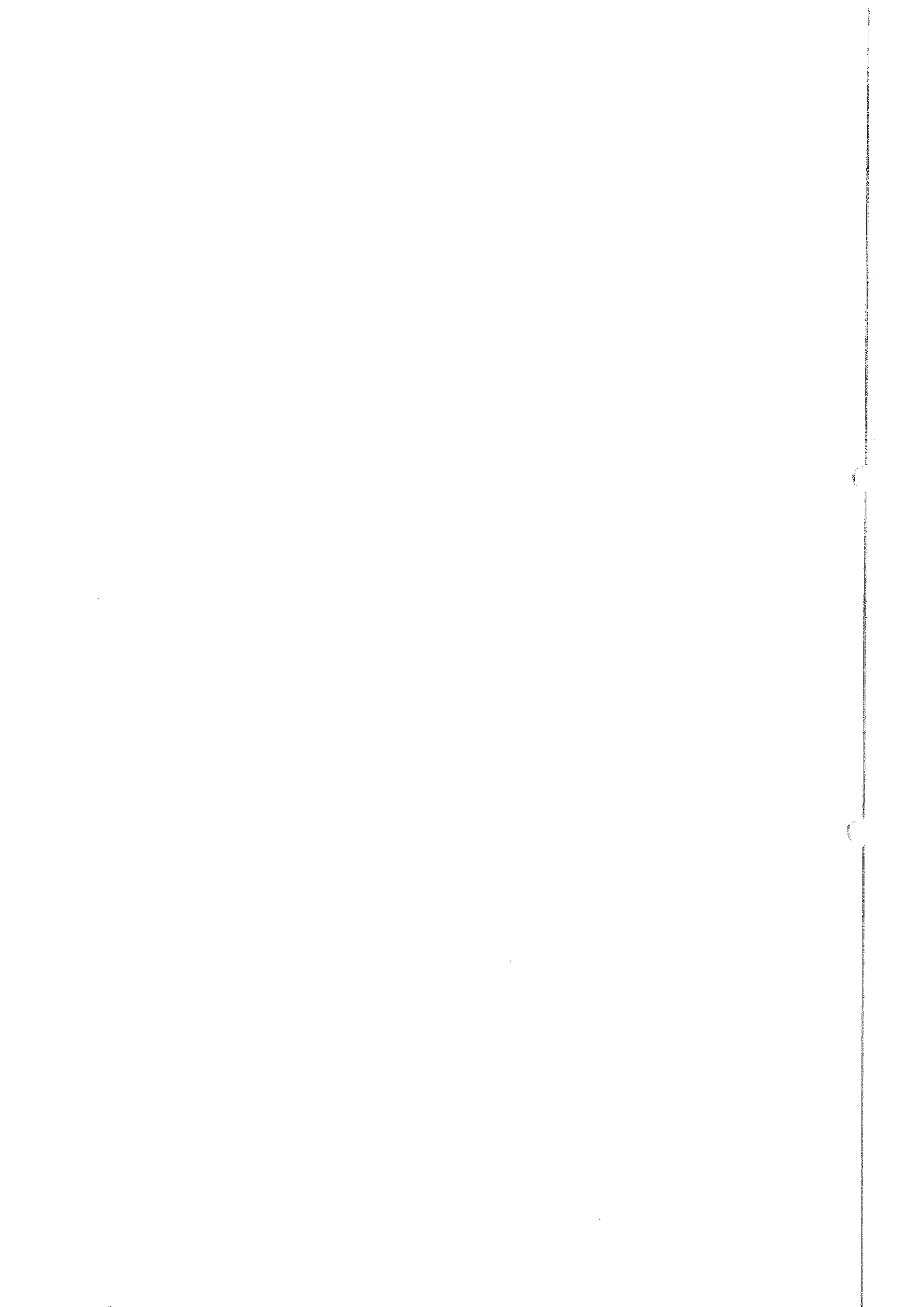
5km	Cambridge 5-km Telescope
6C	Cambridge low frequency northern survey
CLFST	Cambridge Low Frequency Synthesis Telescope
DRAO	Dominion Radio Astrophysical Observatory
FIRST	Fleurs Synthesis Telescope
GEETEE	Gauribidanur 'T' array
HMT	Cambridge Half-Mile Telescope
MOST	Molonglo Observatory Synthesis Telescope
NRAO	National Radio Astronomy Observatory
NRO	Nobeyama Radio Observatory
OMT	Cambridge One-Mile Telescope
OSRT	Ooty Synthesis Radio Telescope
TPT	Clark Lake TPT telescope
VLA	Very Large Array
VRO	Vermillion River Observatory
WSRT	Westerbork Synthesis Radio Telescope

**Telescopes: X-ray**

EXOSAT	European X-ray Observatory Satellite
ROSAT	Röntgensatellit

## On board Einstein (HEAO-2)

FPCS	Focal Plane Crystal Spectrometer
HRI	High Resolution Imager
IPC	Imaging Proportional Counter
SSS	Solid State Spectrometer



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**G0.0 + 0.0**

Sgr A East

RA: 17<sup>h</sup>42<sup>m</sup>33<sup>s</sup>  
Dec: -28°59'1-GHz flux (Jy): 100?  
Spectral index: 0.8?Size (arcmin): 3.5 × 2.5  
Type: S

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

**References:**

Ekers *et al.* 1983, AA, 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, AA, 209, 337. Nearby molecular material.  
Ho *et al.* 1991, Nature, 350, 309. VLA of NH<sub>3</sub> emission from surroundings.  
Serabyn *et al.* 1992, ApJ, 395, 166. Nearby molecular material.

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**G0.9 + 0.1**RA: 17<sup>h</sup>44<sup>m</sup>12<sup>s</sup>  
Dec: -28°08'1-GHz flux (Jy): 18?  
Spectral index: variesSize (arcmin): 8  
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.

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**G1.9 + 0.3**RA: 17<sup>h</sup>45<sup>m</sup>37<sup>s</sup>  
Dec: -27°09'1-GHz flux (Jy): 0.6  
Spectral index: 0.7Size (arcmin): 1.2  
Type: S

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

**References:**

Green & Gull 1984, Nature, 312, 527. VLA at 5 GHz (4'' .4 × 2'').

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**G4.2 - 3.5**RA: 18<sup>h</sup>05<sup>m</sup>45<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

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## G4.5 + 6.8

Kepler, SN1604, 3C358

RA: 17<sup>h</sup>27<sup>m</sup>42<sup>s</sup>

1-GHz flux (Jy): 19

Size (arcmin): 3

Dec: -21°27'

Spectral index: 0.64

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.

Danziger & Goss 1980, MN, 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.

## G5.2 - 2.6

RA: 18<sup>h</sup>04<sup>m</sup>25<sup>s</sup>

1-GHz flux (Jy): 2.6?

Size (arcmin): 18

Dec: -25°45'

Spectral index: 0.6?

Type: S

**Radio:** Poorly resolved shell.

**References:**

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

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

## G5.4 - 1.2

Milne 56

RA: 17<sup>h</sup>59<sup>m</sup>00<sup>s</sup>

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.

**Point sources:** Pulsar associated with flat spectrum source.

**References:**

Clark *et al.* 1975, AJPAS, 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, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

Angerhofer *et al.* 1977, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 : S = 21.9 ± 2.4).

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Zealey *et al.* 1979, AAS, 38, 39. Optical detection.

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

Manchester *et al.* 1985, MN, 212, 975. Pulsar detection.

Caswell *et al.* 1987, MN, 225, 329. MOST at 843 MHz (42" × 110").

Frail & Kulkarni 1991, Nature, 352, 785. Pulsar and remnant association.

Manchester *et al.* 1991, MN, 253, 7P. Pulsar and remnant association.

Milne *et al.* 1992, MN, 255, 707. Parkes 64-m at 4.75 (4'.5 : S = 30.8 ± 2.1) and 8.4 GHz (3' : S = 24 ± 3), including polarization.

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



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G5.9 + 3.1

RA: 17<sup>h</sup>44<sup>m</sup>20<sup>s</sup>  
Dec: -22° 15'

1-GHz flux (Jy): 3.3?  
Spectral index: 0.4?

Size (arcmin): 20  
Type: S

Radio: Asymmetric shell.

## References:

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

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## G6.1 + 1.2

RA: 17<sup>h</sup>51<sup>m</sup>55<sup>s</sup>  
Dec: -23° 05'

1-GHz flux (Jy): 4.0?  
Spectral index: 0.3?

Size (arcmin): 30 × 26  
Type: F

Radio: Faint, diffuse emission.

## References:

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

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

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## G6.4 - 0.1

W28

RA: 17<sup>h</sup>57<sup>m</sup>30<sup>s</sup>  
Dec: -23° 25'

1-GHz flux (Jy): 310  
Spectral index: varies

Size (arcmin): 42  
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: Compact X-ray source near centre.

Distance: Uncertain mean optical velocity indicates 3.5-4 kpc.

## References:

Kundu & Velusamy 1972, AA, 20, 23. NRAO 140-ft at 10 GHz (3').

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

Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

Dopita *et al.* 1977, ApJ, 214, 179. Some optical line ratios.

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Lozinskaya 1981, SAL, 7, 17. Mean optical velocity.

Andrews *et al.* 1983, ApJ, 266, 684. VLA at 1.4 GHz (8'') 4.9 GHz (3'') and 15 GHz (1'') of central region only, plus HRI image of central region.

Bohigas *et al.* 1983, RMex, 8, 155. Optical spectra.

Odenwald *et al.* 1984, ApJ, 279, 162. Nearby IR source.

Andrews *et al.* 1985, AJ, 90, 310. VLA of central component.

Long *et al.* 1991, ApJ, 373, 567. IPC and optical observations.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.1 × 4'.4 : S = 660).

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## G6.4 + 4.0

RA: 17<sup>h</sup>42<sup>m</sup>10<sup>s</sup>  
Dec: -21° 20'

1-GHz flux (Jy): 1.3?  
Spectral index: 0.4?

Size (arcmin): 31  
Type: S

Radio: Faint asymmetric shell.

## References:

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

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G7.7 - 3.7

1814-24

RA: 18<sup>h</sup>14<sup>m</sup>20<sup>s</sup>

1-GHz flux (Jy): 10

Size (arcmin): 18

Dec: -24°05'

Spectral index: 0.32

Type: S

Radio: Shell, with high polarization.

## References:

Dickel &amp; Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

Milne *et al.* 1986, MN, 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 fluxes.

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G8.7 - 5.0RA: 18<sup>h</sup>21<sup>m</sup>05<sup>s</sup>

1-GHz flux (Jy): 4.4

Size (arcmin): 26

Dec: -23°50'

Spectral index: 0.3

Type: S

Radio: Asymmetric shell.

## References:

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

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G8.7 - 0.1

(W30)

RA: 18<sup>h</sup>02<sup>m</sup>35<sup>s</sup>

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.

Point sources: Pulsar near western edge.

## References:

Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (7'.2 × 9'.7 :  $S = 190 \pm 50$ ).

Kassim &amp; Weiler 1990, Nature, 343, 146. VLA at 327 MHz (3'.0 × 3'.7).

Kassim & Weiler 1990, ApJ, 360, 184. VLA at 327 MHz (2'.8 × 4'.1 :  $S = 129 \pm 11$ ), and part at 1.4 GHz (0'.9 × 1'.8), plus review of fluxes.

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G9.8 + 0.6RA: 18<sup>h</sup>02<sup>m</sup>10<sup>s</sup>

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, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).Caswell 1983, MN, 204, 833. Molonglo at 408 MHz (3' :  $S = 5.8 \pm 0.6$ ).

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G10.0 - 0.3RA: 18<sup>h</sup>05<sup>m</sup>40<sup>s</sup>

1-GHz flux (Jy): 2.9

Size (arcmin): 8?

Dec: -20°26'

Spectral index: 0.8

Type: S?

Radio: Not well resolved.

## References:

Shaver &amp; Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

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**G11.2 - 0.3**RA: 18<sup>h</sup>08<sup>m</sup>30<sup>s</sup>  
Dec: -19°26'1-GHz flux (Jy): 22  
Spectral index: 0.49Size (arcmin): 4  
Type: S

Probably associated with the SN of AD386.

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

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

**Distance:** HI absorption indicates 5 kpc.

**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Radhakrishnan *et al.* 1970, ApJS, 24, 49. HI absorption.  
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3').  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Downes 1984, MN, 210, 845. VLA at 1465 MHz (20'' × 25'') and HRI observations, with review of fluxes.  
Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz, plus HI absorption, HRI and IPC observations.  
Morsi & Reich 1987, AAS, 71, 189. Effelsberg 100-m at 32 GHz (26''.5 :  $S = 4.04 \pm 0.24$ ).  
Green *et al.* 1988, MN, 231, 735. VLA at 1.4 and 5 GHz.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.2 × 4'.1 :  $S = 39$ ).

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**G11.4 - 0.1**RA: 18<sup>h</sup>07<sup>m</sup>50<sup>s</sup>  
Dec: -19°06'1-GHz flux (Jy): 6  
Spectral index: 0.5Size (arcmin): 8  
Type: S?

**Radio:** Incomplete shell.

**References:**

Clark *et al.* 1975, AJPAS, 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, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 :  $S = 2.0 \pm 0.4$ ).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.2 × 4'.1 :  $S = 18$ ).

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**G12.0 - 0.1**RA: 18<sup>h</sup>09<sup>m</sup>15<sup>s</sup>  
Dec: -18°38'1-GHz flux (Jy): 3.5  
Spectral index: 0.7Size (arcmin): 5?  
Type: ?

**Radio:** Non-thermal source overlapping with thermal source, not well resolved, may be part of a larger source?

**References:**

Clark *et al.* 1975, AJPAS, 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, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.2 × 4'.1).

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**G13.5 + 0.2**RA: 18<sup>h</sup>11<sup>m</sup>20<sup>s</sup>  
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'' :  $S = 2.67 \pm 0.5$ ).

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**G15.1 - 1.6**

RA: 18<sup>h</sup>21<sup>m</sup>05<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

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**G15.9 + 0.2**

RA: 18<sup>h</sup>16<sup>m</sup>00<sup>s</sup>  
Dec: -15°03'

1-GHz flux (Jy): 4.5?  
Spectral index: 0.7?

Size (arcmin): 7 × 5  
Type: S?

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

**References:**

Clark *et al.* 1976, AJPAS, 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, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 : S = 1.1 ± 0.2).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Caswell *et al.* 1982, MN, 200, 1143. FIRST at 1415 MHz (58'' × 44'').

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**G16.7 + 0.1**

RA: 18<sup>h</sup>18<sup>m</sup>05<sup>s</sup>  
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).

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**G16.8 - 1.1**

RA: 18<sup>h</sup>22<sup>m</sup>30<sup>s</sup>  
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, AA, 155, 185. Effelsberg 100-m at 4.75 GHz (2'.4), plus other observations.

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**G17.4 - 2.3**

RA: 18<sup>h</sup>28<sup>m</sup>05<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

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## G17.8 - 2.6

RA:  $18^{\text{h}}30^{\text{m}}00^{\text{s}}$   
Dec:  $-14^{\circ}41'$

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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).

## G18.8 + 0.3

Kes 67

RA:  $18^{\text{h}}21^{\text{m}}10^{\text{s}}$   
Dec:  $-12^{\circ}25'$

1-GHz flux (Jy): 27  
Spectral index: 0.5

Size (arcmin):  $18 \times 13$   
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, AA, 26, 237. NRAO 300-ft at 2.7 GHz ( $5' : S = 17 \pm 7$ ).  
Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz ( $3' : S = 38$ ).  
Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ( $8'.4$ ) and 5 GHz ( $4'.4$ ).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
Milne *et al.* 1989, PASA, 8, 187. Parkes 64-m at 8.4 GHz ( $3'.0 : S = 12.9 \pm 1.0$ ), including polarization.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $2'.9 \times 3'.5 : S = 55$ ).

## G18.9 - 1.1

RA:  $18^{\text{h}}27^{\text{m}}00^{\text{s}}$   
Dec:  $-13^{\circ}00'$

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

## G20.0 - 0.2

RA:  $18^{\text{h}}25^{\text{m}}20^{\text{s}}$   
Dec:  $-11^{\circ}37'$

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 ( $7'.2 \times 8' : S = 8.5 \pm 2$ ), plus review of fluxes.

**G21.5 - 0.9**

RA: 18<sup>h</sup>30<sup>m</sup>47<sup>s</sup>  
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, AA, 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 fluxes.

Altenhoff *et al.* 1979, AAS, 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, AAS, 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, AA, 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 fluxes.

Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.

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

**G21.8 - 0.6**

Kes 69

RA: 18<sup>h</sup>30<sup>m</sup>00<sup>s</sup>  
Dec: -10°10'

1-GHz flux (Jy): 69  
Spectral index: 0.5

Size (arcmin): 20  
Type: S

**Radio:** Incomplete shell.

**X-ray:** Detected.

**Distance:** H<sub>2</sub>CO absorption indicates >6.3 kpc.

**References:**

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

Wilson 1972, AA, 19, 354. H<sub>2</sub>CO absorption.

Kundu *et al.* 1974, AJ, 79, 1332. NRAO 140-ft at 5 GHz (6') and 10 GHz (3').

Velusamy & Kundu 1974, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 42.3 \pm 4.6$ ).

Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

Altenhoff *et al.* 1979, AAS, 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<sup>h</sup>30<sup>m</sup>30<sup>s</sup>  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

Altenhoff *et al.* 1979, AAS, 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<sup>h</sup>32<sup>m</sup>00<sup>s</sup>  
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.

**References:**

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

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.3 × 3'.4 :  $S = 138$ ).

**G23.6 + 0.3**

RA: 18<sup>h</sup>30<sup>m</sup>20<sup>s</sup>  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

**G24.7 - 0.6**

RA: 18<sup>h</sup>36<sup>m</sup>00<sup>s</sup>  
Dec: -07°35'

1-GHz flux (Jy): 8  
Spectral index: 0.5

Size (arcmin): 15?  
Type: S?

Radio: Incomplete shell?

## References:

Clark *et al.* 1975, AJPAS, 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, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 :  $S = 2.2 \pm 0.5$ ).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

**G24.7 + 0.6**

RA: 18<sup>h</sup>31<sup>m</sup>30<sup>s</sup>  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Reich *et al.* 1984, AA, 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<sup>h</sup>38<sup>m</sup>40<sup>s</sup>  
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, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5').  
Dickel & Mihne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).  
Angerhofer *et al.* 1977, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 :  $S = 2.0 \pm 0.5$ ).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz (3' :  $S = 4.4$ ).  
Caswell *et al.* 1982, MN, 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.

**G27.8 + 0.6**

RA: 18<sup>h</sup>37<sup>m</sup>06<sup>s</sup>  
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, AA, 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 :  $S = 8.5 \pm 2$ ).

**G29.7 - 0.3**

Kes 75

RA: 18<sup>h</sup>43<sup>m</sup>48<sup>s</sup>  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

Milne & Dickel 1974, AJP, 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 fluxes.

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Weiler 1983, in IAU101, p299. Includes 5-GHz map (private communication from van Gorkom *et al.*).

Becker *et al.* 1983, ApJ, 268, L83. 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, AAS, 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 fluxes.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.4 × 3'.7 :  $S = 27.4$ ).

**G30.7 - 2.0**

RA: 18<sup>h</sup>51<sup>m</sup>50<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

**G30.7 + 1.0**

RA: 18<sup>h</sup>42<sup>m</sup>10<sup>s</sup>  
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, AA, 155, 185. Effelsberg 100-m at 4.75 GHz (2'.4 :  $S = 3.4 \pm 0.4$ ), plus other fluxes.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.6 × 3'.9 :  $S = 8.6$ ).



**G31.5 - 0.6**

RA: 18<sup>h</sup>48<sup>m</sup>35<sup>s</sup>  
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, AAS, 69, 403. Effelsberg 100-m at 4.75 GHz (2'.4), plus other fluxes.

**G31.9 + 0.0**

3C391

RA: 18<sup>h</sup>46<sup>m</sup>50<sup>s</sup>  
Dec: -00°59'

1-GHz flux (Jy): 24  
Spectral index: 0.55

Size (arcmin): 5  
Type: S

Radio: Incomplete shell.

X-ray: Diffuse shell.

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

## References:

Radhakrishnan *et al.* 1970, ApJS, 24, 49. HI absorption.

Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3').

Green *et al.* 1975, AA, 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 fluxes.

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Goss *et al.* 1979, AA, 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 :  $S = 44.8$ ).

**G32.0 - 4.9**

3C396.1

RA: 19<sup>h</sup>03<sup>m</sup>00<sup>s</sup>  
Dec: -03°00'

1-GHz flux (Jy): 22?  
Spectral index: 0.5?

Size (arcmin): 60?  
Type: S?

Radio: Possible large shell?

## References:

Milne & Hill 1969, AJP, 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 fluxes.

Caswell 1970, AJP, 23, 105. Revision of low frequency fluxes.

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 111 MHz ( $S = 105 \pm 30$ ).

**G32.8 - 0.1**

Kes 78

RA: 18<sup>h</sup>48<sup>m</sup>50<sup>s</sup>  
Dec: -00°12'

1-GHz flux (Jy): 11?  
Spectral index: 0.2?

Size (arcmin): 17  
Type: S?

Part has been called G33.1-0.1.

Radio: Elongated shell?

## References:

Velusamy & Kundu 1974, AA, 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, AJPAS, 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, AAS, 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<sup>h</sup>51<sup>m</sup>12<sup>s</sup>  
Dec: -00°05'

1-GHz flux (Jy): 5?  
Spectral index: varies

Size (arcmin): 18  
Type: S

Radio: Incomplete shell.

**References:**

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Reich 1982, AA, 106, 314. Effelsberg 100-m at 2.7 GHz (4'.4 :  $S = 2.6 \pm 0.3$ ) and 4.75 GHz (2'.5 :  $S = 1.75 \pm 0.2$ ).

**G33.6 + 0.1**

RA: 18<sup>h</sup>50<sup>m</sup>15<sup>s</sup>  
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, AJPAS, 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, AA, 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, AA, 55, 11. NRAO 140-ft at 5 GHz (6'.8 :  $S = 11.4 \pm 1.1$ ).  
Caswell *et al.* 1981, MN, 195, 89. FIRST at 1415 MHz (1'), plus observations of the nearby point source.  
van Gorkom *et al.* 1982, MN, 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, MN, 238, 737. OH absorption.  
Frail & Clifton 1989, ApJ, 336, 854. VLA at 1.4 GHz (1' x 2'.9), including HI absorption.  
Velusamy *et al.* 1991, AJ, 102, 676. VLA at 327 MHz (1'), 1.5 (7'' x 14'') and 5 GHz (7''), including spectral comparison.  
Green & Dewdney 1992, MN, 254, 686. Observations of adjacent molecular material.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.6 x 3'.8 :  $S = 34.8$ ).

**G34.7 - 0.4**

RA: 18<sup>h</sup>53<sup>m</sup>30<sup>s</sup>  
Dec: +01°18'

1-GHz flux (Jy): 230  
Spectral index: 0.30

W44, 3C392

Size (arcmin): 35 x 27  
Type: S

Has been called G34.6-0.5.

Radio: Distorted shell, brighter to the E.

X-ray: Centrally concentrated.

Point sources: Pulsar within the boundary of the remnant.

Distance: HI absorption indicates 3 kpc.

**References:**

Kundu & Velusamy 1972, AA, 20, 23. NRAO 140-ft at 10.7 GHz (3' :  $S = 105 \pm 7$ ).  
Velusamy & Kundu 1974, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 177 \pm 10$ ).  
Caswell *et al.* 1975, AA, 45, 239. HI absorption.  
Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz (3' :  $S = 299$  which is less than the 390 Jy found by Kesteven 1968, AJP, 21, 739 with the same telescope).  
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 540 \pm 187$ .  
Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Smith *et al.* 1985, MN, 217, 99. IPC observations.  
Wolszczan *et al.* 1991, ApJ, 372, L99. Pulsar detection.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.6 x 3'.8 :  $S = 469$ ).

**G36.6 - 0.7**

RA: 18<sup>h</sup>58<sup>m</sup>05<sup>s</sup>  
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, AAS, 69, 403. Effelsberg 100-m at 4.75 GHz (2'.4), plus other fluxes.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.4 × 3'.7 : S = 6.7).

**G36.6 + 2.6**

RA: 18<sup>h</sup>46<sup>m</sup>20<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

**G39.2 - 0.3**

RA: 19<sup>h</sup>01<sup>m</sup>40<sup>s</sup>  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3').  
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo S(430) = 54 ± 38.  
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3' : S = 4.1 ± 1.0).  
Caswell *et al.* 1975, AA, 45, 239. HI absorption.  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
Caswell *et al.* 1982, MN, 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, AA, 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 fluxes.  
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.5 × 3'.6 : S = 42.5).

**G39.7 - 2.0**

W50, SS433

**RA:** 19<sup>h</sup>10<sup>m</sup>00<sup>s</sup>  
**Dec:** +04°50'

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

**Size (arcmin):** 120 × 60  
**Type:** ?

**Radio:** 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 $\alpha$  and [SII].  
 Zealey *et al.* 1980, MN, 192, 731. Optical spectra.  
 van Gorkom *et al.* 1982, MN, 198, 757. WSRT HI absorption to nearby point source (not SS433).  
 Sequist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Watson *et al.* 1983, ApJ, 273, 688. X-ray observations.  
 Downes *et al.* 1986, MN, 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.

**G40.5 - 0.5**

**RA:** 19<sup>h</sup>04<sup>m</sup>45<sup>s</sup>  
**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, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
 Downes *et al.* 1980, AA, 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 fluxes.

**G41.1 - 0.3**

3C397

**RA:** 19<sup>h</sup>05<sup>m</sup>08<sup>s</sup>  
**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, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 21.3 \pm 1.2$  for both components).  
 Caswell *et al.* 1975, AA, 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, AJPAS, 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, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
 Caswell *et al.* 1982, MN, 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, AAS, 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 :  $S = 46.3$ ).

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G42.8 + 0.6RA: 19<sup>h</sup>04<sup>m</sup>55<sup>s</sup>  
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.

## References:

Fürst *et al.* 1987, AAS, 69, 403. Effelsberg 100-m at 4.75 GHz ( $2'.4 : S = 1.5 \pm 0.2$ ), plus other fluxes.

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G43.3 - 0.2RA: 19<sup>h</sup>08<sup>m</sup>44<sup>s</sup>  
Dec: +09°01'1-GHz flux (Jy): 38  
Spectral index: 0.48Size (arcmin): 4 × 3  
Type: S

W49B

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, AJPAS, 14, 133. Molonglo at 408 MHz ( $3'$ ) and Parkes 64-m at 2.7 GHz ( $4'$ ).Downes & Wilson 1974, AA, 34, 133. Effelsberg 100-m at 10.7 GHz ( $1'.3$ ).Caswell *et al.* 1975, AA, 45, 239. HI absorption.Green *et al.* 1975, AA, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58'' : S = 9.0 \pm 0.7$ ).Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).Pye *et al.* 1984, MN, 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, AAS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to  $30'' : S = 6.90 \pm 0.38$ ).

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G43.9 + 1.6RA: 19<sup>h</sup>03<sup>m</sup>30<sup>s</sup>  
Dec: +10°25'1-GHz flux (Jy): 8.6?  
Spectral index: 0.0?Size (arcmin): 60?  
Type: F?

Radio: Large, poorly defined faint source.

## References:

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

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G45.7 - 0.4RA: 19<sup>h</sup>14<sup>m</sup>05<sup>s</sup>  
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, AAS, 69, 403. Effelsberg 100-m at 4.75 GHz ( $2'.4 : S = 2.6 \pm 0.3$ ), plus other fluxes.

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<b>G46.8 - 0.3</b>		<b>(HC30)</b>
<b>RA:</b> 19 <sup>h</sup> 15 <sup>m</sup> 50 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 14	<b>Size (arcmin):</b> 17 × 13
<b>Dec:</b> +12°04'	<b>Spectral index:</b> 0.42	<b>Type:</b> 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, AA, 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, AJPAS, 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, AA, 55, 11. NRAO 140-ft at 5 GHz ( $6'.8 : S = 5.9 \pm 0.6$ ).  
 Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
 Sato 1979, AL, 20, 43. HI absorption.

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<b>G49.2 - 0.7</b>		<b>(W51)</b>
<b>RA:</b> 19 <sup>h</sup> 21 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 160?	<b>Size (arcmin):</b> 25?
<b>Dec:</b> +14°00'	<b>Spectral index:</b> 0.3?	<b>Type:</b> S?

**Radio:** In complex region, parameters uncertain.

**X-ray:** Detected.

**Distance:** HI absorption suggests 4.1 kpc.

**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Parkes 64-m at 5 GHz ( $4'$ ).  
 Sato 1973, PASJ, 25, 135. HI absorption.  
 Velusamy & Kundu 1974, AA, 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, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Copetti & Schmidt 1991, MN, 250, 127. CLFST at 151 MHz.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3'.1 \times 3'.5$ ).

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<b>G53.6 - 2.2</b>		<b>3C400.2, NRAO 611</b>
<b>RA:</b> 19 <sup>h</sup> 36 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 8	<b>Size (arcmin):</b> 28
<b>Dec:</b> +17°08'	<b>Spectral index:</b> 0.6	<b>Type:</b> S

Has been called G53.7-2.2.

**Radio:** Incomplete ring of emission, in complex region.

**Optical:** Filaments and diffuse emission.

**X-ray:** Brightest to northwest.

**Distance:** Mean optical velocity indicates 6.7 kpc.

**References:**

Willis 1973, AA, 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, AA, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 4.8 \pm 0.3$ ).  
 Clark *et al.* 1975, AJPAS, 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, AA, 43, 459. WSRT at 610 MHz ( $1' \times 3' : S = 13.2 \pm 1.6$ ).  
 Sabbadin & d'Odorico 1976, AA, 49, 119. Optical spectra.  
 Rosado 1983, RMex, 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.

**G54.1 + 0.3**

RA: 19<sup>h</sup>28<sup>m</sup>28<sup>s</sup>  
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, MN, 216, 691. 5km at 2.7 GHz (7'' × 20'').

Reich *et al.* 1985, AA, 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 fluxes.

Seward 1989, AJ, 97, 481. IPC observations

**G54.4 - 0.3**

(HC40)

RA: 19<sup>h</sup>31<sup>m</sup>10<sup>s</sup>  
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, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 34.4 \pm 5.0$ ).

Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).

Caswell 1985, AJ, 90, 1224. DRAO at 1.4 GHz (1'.3 × 2'.6 :  $S = 18 \pm 4$ ).

Velusamy *et al.* 1986, JAA, 7, 105. WSRT at 609 MHz (50'' × 191'' smoothed to 100'' × 200'').

Junkes *et al.* 1992, AAS, 91, 1. Surrounding CO.

Junkes *et al.* 1992, AA, 261, 289. Nearby IRAS sources.

**G55.7 + 3.4**

RA: 19<sup>h</sup>19<sup>m</sup>10<sup>s</sup>  
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, AA, 61, 93. WSRT observations at 610 MHz (57'' × 156'' :  $S = 1.9 \pm 0.2$ ) and 1415 MHz (27'' × 72'' :  $S = 1.0 \pm 0.1$ ).

**G57.2 + 0.8**

(4C21.53)

RA: 19<sup>h</sup>32<sup>m</sup>50<sup>s</sup>  
Dec: +21°50'

1-GHz flux (Jy): 1.8?  
Spectral index: ?

Size (arcmin): 12?  
Type: S?

Radio: Extended non-thermal arc.

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

**References:**

Sieber & Seiradakis 1984, AA, 130, 257. Effelsberg 100-m at 1.4 GHz (8'.8 :  $1.34 \pm 0.1$ ), 2.7 GHz (4'.3 :  $0.86 \pm 0.1$ ), 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:  $19^{\text{h}}40^{\text{m}}25^{\text{s}}$   
Dec:  $+23^{\circ}28'$

1-GHz flux (Jy): 3?  
Spectral index: ?

Size (arcmin): 5  
Type: S

**Radio:** Incomplete shell.

**References:**

Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz ( $2'.5 \times 1'.0$ :  $S = 5.1 \pm 0.2$ ), and northern sky survey at 4.9 GHz.

**G59.8 + 1.2**

RA:  $19^{\text{h}}36^{\text{m}}50^{\text{s}}$   
Dec:  $+24^{\circ}12'$

1-GHz flux (Jy): 1.6  
Spectral index: 0.5

Size (arcmin):  $20 \times 16?$   
Type: ?

**Radio:** Poorly defined source.

**References:**

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

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

**G65.1 + 0.6**

RA:  $19^{\text{h}}52^{\text{m}}30^{\text{s}}$   
Dec:  $+28^{\circ}25'$

1-GHz flux (Jy): 6  
Spectral index: 0.6

Size (arcmin):  $90 \times 50$   
Type: S

**Radio:** Large, faint shell.

**References:**

Landecker *et al.* 1990, AA, 232, 207. DRAO at 408 MHz ( $3'.5 \times 7'.0$ :  $S = 9.5 \pm 0.1$ ), and 1.4 GHz ( $1'.0 \times 2'.0$ :  $S = 5.4 \pm 1.0$ ).

**G65.3 + 5.7**

RA:  $19^{\text{h}}31^{\text{m}}00^{\text{s}}$   
Dec:  $+31^{\circ}05'$

1-GHz flux (Jy): 52?  
Spectral index: 0.6?

Size (arcmin):  $310 \times 240$   
Type: S?

Has been called G65.2+5.7.

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

**Optical:** Strong in  $H\alpha$ + $[NII]$  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, AA, 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, SAL, 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.



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G65.7 + 1.2		DA 495
RA: 19 <sup>h</sup> 50 <sup>m</sup> 10 <sup>s</sup>	1-GHz flux (Jy): 5.1	Size (arcmin): 18
Dec: +29° 18'	Spectral index: 0.6	Type: ?

Has mistakenly been called G55.7+1.2.

**Radio:** Filled-centre or thick shell?

**References:**

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

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, JAA, 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.

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G67.7 + 1.8		
RA: 19 <sup>h</sup> 52 <sup>m</sup> 34 <sup>s</sup>	1-GHz flux (Jy): 1.4	Size (arcmin): 9
Dec: +31° 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 ( $S = 0.42 \pm 0.05$ ).

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G68.6 - 1.2		
RA: 20 <sup>h</sup> 06 <sup>m</sup> 40 <sup>s</sup>	1-GHz flux (Jy): 0.7?	Size (arcmin): 28 × 25?
Dec: +30° 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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).

**G69.0 + 2.7**

CTB 80

**RA:** 19<sup>h</sup>51<sup>m</sup>30<sup>s</sup>**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, AA, 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, JAA, 3, 253. VLA of compact sources.
- Wang & Seward 1984, ApJ, 285, 607. IPC observations.
- Strom *et al.* 1984, AA, 139, 43. Radio observations of flat spectrum component, VLA 5 GHz (1''.7) and 1.4 GHz.
- Mantovani *et al.* 1985, AA, 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 fluxes.
- Kulkarni *et al.* 1988, Nature, 331, 50. Pulsar detection.
- Angelini *et al.* 1988, ApJ, 330, L43. EXOSAT spectra.
- Fesen *et al.* 1988, Nature, 334, 229. IRAS of surrounding shell.
- Whitehead *et al.* 1989, MN, 237, 1109. Optical of core.
- Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of fluxes.
- Hester & Kulkarni 1989, ApJ, 340, 362. Optical imaging and spectroscopy.
- Koo *et al.* 1990, ApJ, 364, 178. Large, expanding HI shell.
- Greidanus & Strom 1990, AA, 240, 376. Optical kinematics of core.

**G69.7 + 1.0****RA:** 20<sup>h</sup>00<sup>m</sup>45<sup>s</sup>**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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

**G73.9 + 0.9****RA:** 20<sup>h</sup>12<sup>m</sup>20<sup>s</sup>**1-GHz flux (Jy):** 9?**Size (arcmin):** 22?**Dec:** +36°03'**Spectral index:** 0.3?**Type:** S?

**Radio:** Incomplete, clumpy shell.

**References:**

- Reich *et al.* 1986, AA, 155, 185. Effelsberg 100-m at 4.75 GHz (2'.4 :  $S = 6.7 \pm 0.5$ ), plus other fluxes.
- 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, MN, 246, 169. DRAO at 408 MHz (3'.4 × 5'.8 :  $S = 12.7 \pm 1.2$ ) and 1.4 GHz (1'.0 × 1'.7 :  $S = 7.4 \pm 1.0$ ).

G74.0 - 8.5		Cygnus Loop	
RA: 20 <sup>h</sup> 49 <sup>m</sup> 00 <sup>s</sup>	1-GHz flux (Jy): 210	Size (arcmin): 230 × 160	Type: S
Dec: +30°30'	Spectral index: varies		

**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, AA, 28, 197. Effelsberg 100-m at 2.7 GHz (4'.8), NE at 10.7 GHz (1'.25).  
 Dickel & Willis 1980, AA, 85, 55. WSRT at 610 MHz (56'' × 107'') of NE area (NGC6992) only.  
 Scaquist & 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, MN, 211, 433. Most of remnant at 408 MHz (80'' × 160'') with OMT.  
 Charles *et al.* 1985, ApJ, 295, 456. IPC observations.  
 Braum & Strom 1986, AA, 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, AA, 211, 217. [FeX] and [FeXIV] spectroscopy.  
 Ballet & Rothenflug 1989, AA, 218, 227. 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, AA, 257, 265. Optical kinematics.  
 Shull & Hippelein 1992, ApJ, 383, 714. Optical kinematics and proper motion.  
 Fesen *et al.* 1992, AJ, 104, 719. H $\alpha$  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.

G74.9 + 1.2		CTB 87	
RA: 20 <sup>h</sup> 14 <sup>m</sup> 10 <sup>s</sup>	1-GHz flux (Jy): 9	Size (arcmin): 8 × 6	Type: F
Dec: +37°03'	Spectral index: varies		

**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  $S(430) = 12.2 \pm 9.7$ ,  $S(318) = 9.7 \pm 2.2$ .  
 Weiler & Shaver 1978, AA, 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, AA, 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, MN, 198, 757. WSRT HI absorption of nearby compact source.  
 Scaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Morsi & Reich 1987, AAS, 69, 533. Effelsberg 100-m at 32 GHz (smoothed to 40'' :  $S = 1.47 \pm 0.19$ ).  
 Green & Gull 1989, MN, 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 fluxes.  
 Pineault & Chastenay 1990, MN, 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, AA, 241, 551. DRAO at 408 MHz (3'.5 × 5'.2 :  $S = 13.3 \pm 0.8$ ) and Effelsberg 100-m at 4.8 GHz ( $S = 7.5 \pm 0.7$ ).

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<b>G78.2 + 2.1</b>		DR4, $\gamma$ Cygni
<b>RA:</b> 20 <sup>h</sup> 19 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 340	<b>Size (arcmin):</b> 60
<b>Dec:</b> +40°15'	<b>Spectral index:</b> 0.5	<b>Type:</b> 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 ( $2' \times 3' : S = 270 \pm 40$ ) plus some 10 GHz ( $4'$ ) survey data, reveals true extent of remnant.

d'Odorico & Sabbadin 1977, AAS, 28, 439. Optical spectra.

van den Bergh 1978, ApJS, 38, 119. Optical.

Landecker *et al.* 1980, AAS, 39, 133. DRAO HI observations ( $2' \times 3'.1$ ).

Higgs *et al.* 1983, in IAU101, 281. IPC observations.

Higgs *et al.* 1983, AJ, 88, 97. CO of surroundings.

Bohigas *et al.* 1983, RMex, 8, 155. Optical spectra, find thermal only.

Braun & Strom 1986, AAS, 63, 345. WSRT HI observations.

Fukui & Tatematsu 1988, in SNRISM, p261. CO observations of the vicinity ( $2'.7$ ).

Green 1989, MN, 238, 737. OH observations.

Pineault & Chastenay 1990, MN, 246, 169. DRAO at 408 MHz ( $3'.4 \times 5'.8 : S = 480 \pm 60$ ) and 1.4 GHz ( $1'.0 \times 1'.7 : S = 270 \pm 40$ ).

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

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<b>G82.2 + 5.3</b>		W63
<b>RA:</b> 20 <sup>h</sup> 17 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 120?	<b>Size (arcmin):</b> 95 $\times$ 65
<b>Dec:</b> +45°20'	<b>Spectral index:</b> 0.5?	<b>Type:</b> S

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

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

**X-ray:** Detected.

**References:**

Velusamy & Kundu 1974, AA, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 59.0 \pm 3.5$ ).

Sabbadin 1976, AA, 51, 159. Optical spectra.

Angerhofer *et al.* 1977, AA, 55, 11. NRAO 140-ft at 5 GHz ( $6'.8$ ). Incomplete mapping.

Rosado & González 1981, RMex, 5, 93. Optical spectra.

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

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

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<b>G84.2 - 0.8</b>		
<b>RA:</b> 20 <sup>h</sup> 51 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 11	<b>Size (arcmin):</b> 20 $\times$ 16
<b>Dec:</b> +43°16'	<b>Spectral index:</b> 0.5	<b>Type:</b> S

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

**References:**

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

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

## G84.9 + 0.5

RA: 20<sup>h</sup>48<sup>m</sup>45<sup>s</sup>  
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<sup>h</sup>43<sup>m</sup>30<sup>s</sup>  
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, AA, 26, 237. NRAO 300-ft at 2.7 GHz (5' :  $S = 148 \pm 16$ ), plus optical filaments.  
Hill 1974, MN, 169, 59. HMT at 1.4 GHz (3' × 3'.9).  
Haslam *et al.* 1975, AA, 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, MN, 228, 907. IPC observations.  
Fukui & Tatematsu 1988, in SNRISM, p261. CO observations of the vicinity (2'.7).  
Tatematsu *et al.* 1990, AA, 237, 189. DRAO at 408 MHz (3'.5 × 4'.5) and 1.4 GHz (1'.0 × 1'.3), including H<sub>i</sub>, plus CO observations of adjacent molecular cloud.

## G93.3 + 6.9

DA 530, 4C(T)55.38.1

RA: 20<sup>h</sup>51<sup>m</sup>00<sup>s</sup>  
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, AA, 51, 151. DRAO at 1.42 GHz (2' × 2'.4 :  $S = 6.9$ ).  
Haslam *et al.* 1980, AA, 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 fluxes.  
Lalitha *et al.* 1984, AA, 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<sup>h</sup>27<sup>m</sup>45<sup>s</sup>  
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, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 18.4 \pm 1.0$ ).  
Mantovani *et al.* 1982, AA, 105, 176. Effelsberg 100-m at 1.7 GHz (7'.6 :  $S = 53.5 \pm 5.0$ ), plus review of fluxes.  
Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to 2' :  $S = 58 \pm 6$ ).  
Mantovani *et al.* 1991, AA, 247, 545. Effelsberg 100-m at 4.75 GHz (smoothed to 3' :  $S = 33.5 \pm 4.0$ ), including polarization, plus review of fluxes.

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<b>G94.0 + 1.0</b>		<b>3C434.1</b>
<b>RA:</b> 21 <sup>h</sup> 23 <sup>m</sup> 10 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 15	<b>Size (arcmin):</b> 30 × 25
<b>Dec:</b> +51°40′	<b>Spectral index:</b> 0.44	<b>Type:</b> S

**Radio:** Incomplete shell, in complex region.

**References:**

Willis 1973, AA, 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, AA, 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, AA, 105, 176. Effelsberg 100-m at 1.7 GHz ( $7'.6 : S = 12.0 \pm 1.3$ ), plus review of fluxes.  
 Goss *et al.* 1984, AA, 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  $2' : S = 16 \pm 3$ ).

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<b>G109.1 - 1.0</b>		<b>CTB 109</b>
<b>RA:</b> 22 <sup>h</sup> 59 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 20	<b>Size (arcmin):</b> 28
<b>Dec:</b> +58°37′	<b>Spectral index:</b> 0.50	<b>Type:</b> 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, Nature, 291, 132. Optical spectra.  
 Downes 1983, MN, 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, AAS, 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, AA, 184, 279. CO observations of the surroundings ( $2'.7$ ).  
 Hanson *et al.* 1988, AA, 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, MN, 238, 649. IRAS observations of surroundings.  
 Green 1989, MN, 238, 737. OH observations.  
 Tatematsu *et al.* 1990, ApJ, 351, 157. CO of surroundings, plus X-ray observations.  
 Davies & Coe 1991, MN, 249, 313. Optical and IR observations near pulsar.

## G111.7 - 2.1

Cassiopeia A, 3C461

RA:  $23^{\text{h}}21^{\text{m}}10^{\text{s}}$   
Dec:  $+58^{\circ}32'$

1-GHz flux (Jy): 2720  
Spectral index: 0.77

Size (arcmin): 5  
Type: S

Presumably the remnant of a 17th century SN.

Radio: Bright shell with compact knots and extended plateau of emission.

Optical: Fast knots and quasi-stationary flocculi, with many filaments at large radii.

X-ray: Incomplete shell.

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

## References:

- Bell *et al.* 1975, *Nature*, 257, 463. 5km at 5 GHz ( $2'' \times 2''.3$ ).  
Green *et al.* 1975, *AA*, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58'' : S = 419.1 \pm 1.7$ ).  
Fabian *et al.* 1980, *MN*, 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.  
Tufts 1986, *MN*, 219, 13. Proper motions from 5km maps at 5 GHz ( $2'' \times 2''.3$ ) between 1974 and 1978.  
Mezger *et al.* 1986, *AA*, 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 flocculi.  
Fesen *et al.* 1988, *ApJ*, 329, L89. Optical, flocculi, and "flare".  
Jansen *et al.* 1988, *ApJ*, 331, 949. EXOSAT observations.  
Woan & Duffett-Smith 1990, *MN*, 243, 87. Structure at 81.5 MHz.  
Fesen 1990, *AJ*, 99, 1904. [NeIII] optical imagery.  
Rees 1990, *MN*, 243, 637. Flux density decrease at 38 MHz.  
Greidanus & Strom 1991, *AA*, 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, *AA*, 255, 285. Flux decrease at 81.5 MHz.

## G112.0 + 1.2

RA:  $23^{\text{h}}13^{\text{m}}40^{\text{s}}$   
Dec:  $+61^{\circ}30'$

1-GHz flux (Jy): ??  
Spectral index: 0.6?

Size (arcmin): 30?  
Type: S?

Radio: Non-thermal source hinted by Bologna survey.

## References:

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

## G114.3 + 0.3

RA:  $23^{\text{h}}34^{\text{m}}45^{\text{s}}$   
Dec:  $+61^{\circ}38'$

1-GHz flux (Jy): 6?  
Spectral index: 0.3?

Size (arcmin):  $90 \times 55$   
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, *AA*, 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, *Nature*, 362, 135. Pulsar association.

**G116.5 + 1.1**

RA: 23<sup>h</sup>51<sup>m</sup>20<sup>s</sup>  
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, AA, 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**

CTB 1

RA: 23<sup>h</sup>56<sup>m</sup>40<sup>s</sup>  
Dec: +62°10'

1-GHz flux (Jy): 9?  
Spectral index: 0.5?

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.

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

**References:**

Willis 1973, AA, 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 fluxes.

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

Velusamy & Kundu 1974, AA, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 4.2 \pm 0.2$ ).

Angerhofer *et al.* 1977, AA, 55, 11. NRAO 140-ft at 5 GHz ( $6'.8 : S = 3.0 \pm 0.3$ ).

Dickel & Willis 1980, AA, 85, 55. WSRT at 610 MHz ( $56'' \times 64''$ ) and 1.4 GHz ( $22'' \times 25''$ ).

Reich & Braunsfurth 1981, AA, 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, SAL, 7, 17. Mean optical velocity.

Landecker *et al.* 1982, AJ, 87, 1379. DRAO at 1.42 GHz and HI ( $2' \times 2'.3 : S = 8.3 \pm 0.5$ ), plus review of fluxes.

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

**G117.4 + 5.0**

RA: 23<sup>h</sup>52<sup>m</sup>30<sup>s</sup>  
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, AA, 77, 93. Bologna at 408 MHz ( $4'.2 \times 110' : S = 45 \pm 30\%$ ).



<b>G119.5 + 10.2</b>		<b>CTA 1</b>
<b>RA:</b> 00 <sup>h</sup> 04 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 36	<b>Size (arcmin):</b> 90?
<b>Dec:</b> +72°30'	<b>Spectral index:</b> 0.3	<b>Type:</b> S
<b>Radio:</b> Incomplete shell, poorly defined in north.		
<b>Optical:</b> Faint diffuse nebulosities.		
<b>X-ray:</b> Detected.		
<b>References:</b>		
Sieber <i>et al.</i> 1979, AA, 74, 361. Effelsberg 100-m at 2.7 GHz (4'.4 : S = 23.6 ± 2.8).		
Sieber <i>et al.</i> 1981, AA, 103, 393. Effelsberg 100-m at 2.7 GHz and 1.7 GHz (7'.6 : S = 31.6 ± 2.5), and 6C at 151 MHz (4' : S = 62.6 ± 6).		
Fesen <i>et al.</i> 1981, ApJ, 247, 148. Optical, including spectra.		
Fesen <i>et al.</i> 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 <i>et al.</i> 1993, AJ, 105, 1060. DRAO at 1.4 GHz (1' : S = 34 ± 4), plus H $\alpha$ and IRAS.		
<b>G120.1 + 1.4</b>		<b>Tycho, 3C10, SN1572</b>
<b>RA:</b> 00 <sup>h</sup> 22 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 56	<b>Size (arcmin):</b> 8
<b>Dec:</b> +63°52'	<b>Spectral index:</b> 0.61	<b>Type:</b> S
This is the remnant of the Tycho's SN of AD1572.		
<b>Radio:</b> Shell, brightest to the NE.		
<b>Optical:</b> Faint filaments/knots to the NNW, NE and E.		
<b>X-ray:</b> Shell, coincident with the radio shell, brighter to the NE.		
<b>Point sources:</b> Faint radio source near centre of the remnant, thought to be extragalactic.		
<b>Distance:</b> HI absorption gives 2.0–2.5 kpc, optical proper motion and modelled shock velocity gives 2.3 kpc.		
<b>References:</b>		
Duin & Strom 1975, AA, 39, 33. WSRT at 610 MHz (57'' × 64'') and 5 GHz (7'' × 8'').		
Klein <i>et al.</i> 1979, AA, 76, 120. Effelsberg 100-m at 10.7 GHz (1'.2 : S = 13.1 ± 0.8), plus review of fluxes.		
Strom <i>et al.</i> 1982, MN, 200, 473. WSRT at 1415 MHz (27'' × 31'') from 1971 and 1979, for expansion.		
Dickel <i>et al.</i> 1982, ApJ, 257, 145. Comparison of Radio, X-ray and Optical.		
Reid <i>et al.</i> 1982, ApJ, 261, 485. IPC observations.		
Seward <i>et al.</i> 1983, ApJ, 266, 287. HRI observations.		
Tan & Gull 1985, MN, 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 <i>et al.</i> 1986, MN, 219, 427. H $\alpha$ observations.		
Green & Gull 1987, MN, 224, 1055. VLA HI absorption observations towards central radio source.		
Smith <i>et al.</i> 1988, ApJ, 325, 288. EXOSAT spectrum and image (smoothed to 13'').		
Dickel <i>et al.</i> 1991, AJ, 101, 2151. VLA at 1.4 and 5 GHz (1''.5).		
Wood <i>et al.</i> 1992, AJ, 103, 1338. VLA at 5 GHz (1''.5) polarization studies.		
<b>G126.2 + 1.6</b>		
<b>RA:</b> 01 <sup>h</sup> 18 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 7	<b>Size (arcmin):</b> 70
<b>Dec:</b> +64°00'	<b>Spectral index:</b> varies	<b>Type:</b> S?
<b>Radio:</b> Poorly defined shell.		
<b>Optical:</b> Filaments detected.		
<b>References:</b>		
Reich <i>et al.</i> 1979, AA, 78, L13. Effelsberg 100-m at 1.4 GHz (9' : S = 6.8 ± 0.7) and 2.7 GHz (4'.4 : S = 3.9 ± 0.4).		
Blair <i>et al.</i> 1980, ApJ, 242, 592. Optical detection and spectra.		
Rosado 1982, RMex, 5, 127. Optical spectra.		
Fesen <i>et al.</i> 1983, ApJS, 51, 337. Deep [OIII] imagery.		
Fürst <i>et al.</i> 1984, AA, 133, 11. Effelsberg 100-m at 2.7 GHz (4'.4) and 4.8 GHz (2'.6).		
Joncas <i>et al.</i> 1989, AA, 219, 303. DRAO at 408 MHz (3'.5 × 3'.9 : S = 12 ± 2.5) and part at 1.4 GHz (1'.1 × 1'.0), plus review of fluxes.		

<b>G127.1 + 0.5</b>			R5
<b>RA:</b> 01 <sup>h</sup> 25 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 13	<b>Size (arcmin):</b> 45	
<b>Dec:</b> +62°55'	<b>Spectral index:</b> 0.6	<b>Type:</b> S	

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.

**Distance:** 1.2–1.3 kpc if associated with NGC559.

**References:**

- Caswell 1977, MN, 181, 789. HMT at 1.42 GHz ( $3'.5 \times 3'.9$ ), plus other observations of central source.  
 Salter *et al.* 1978, AA, 66, 77. Effelsberg 100-m at 2.7 GHz ( $4'.4$ ), plus 5 and 8.7 GHz of the central source.  
 Pauls 1977, AA, 59, L13. Effelsberg 100-m at 1.4 GHz ( $9'$ :  $S = 8 \pm 1$ ).  
 Reich *et al.* 1979, AA, 78, L13. Effelsberg 100-m at 1.4 GHz ( $9'$ :  $S = 10.8 \pm 1.3$ ).  
 Pauls *et al.* 1982, AA, 112, 120. WSRT at 610 MHz ( $56'' \times 62''$ ) and HI absorption to the point source with the VLA.  
 Geldzahler & Shaffer 1982, ApJ, 260, L69. Observations of central source.  
 Fürst *et al.* 1984, AA, 133, 11. Effelsberg 100-m at 2.7 GHz ( $4'.4$ ) and 4.8 GHz ( $2'.6$ ).  
 Goss & van Gorkom 1984, JAA, 5, 425. WSRT HI absorption of central source.  
 Joncas *et al.* 1989, AA, 219, 303. DRAO at 408 MHz ( $3'.5 \times 3'.9$ :  $S = 17.9 \pm 2.0$ ) and 1.4 GHz ( $1'.13 \times 1'.0$ :  $S = 10.1 \pm 0.8$ ), plus review of fluxes.

<b>G130.7 + 3.1</b>			3C58, SN1181
<b>RA:</b> 02 <sup>h</sup> 01 <sup>m</sup> 55 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 33	<b>Size (arcmin):</b> $9 \times 5$	
<b>Dec:</b> +64°35'	<b>Spectral index:</b> 0.10	<b>Type:</b> 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:** Indication of a point source in X-ray observations.

**Distance:** HI absorption indicates 2.6 kpc.

**References:**

- Green *et al.* 1975, AA, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58''$ :  $S = 26.7 \pm 0.5$ ).  
 Wilson & Weiler 1976, AA, 49, 357. WSRT at 610 MHz ( $58'' \times 64''$ ), 1.4 GHz ( $24'' \times 27''$ ) and 5 GHz ( $7'' \times 8''$ ).  
 van den Bergh 1978, ApJ, 220, L9. Optical observations.  
 Becker *et al.* 1982, ApJ, 255, 557. X-ray observations.  
 Green & Gull 1982, Nature, 299, 606. 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, MN, 218, 533. CLFST at 151 MHz ( $1'.2 \times 1'.3$ :  $S = 36 \pm 4$ ), 5km at 2.7 GHz ( $4''$ ), plus IPC observations for limit on shell.  
 Green 1987, MN, 225, 11P. Flux increase at 408 MHz.  
 Morsi & Reich 1987, AAS, 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 fluxes.  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Green & Scheuer 1992, MN, 258, 833. IRAS upper limits.

## G132.7 + 1.3

HB3

RA: 02<sup>h</sup>14<sup>m</sup>00<sup>s</sup>  
Dec: +62°30'

1-GHz flux (Jy): 45  
Spectral index: 0.6

Size (arcmin): 80  
Type: S

Has been called G132.4+2.2.

Radio: Faint shell, adjacent to W3/4/5 complex.

Optical: Incomplete 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, AA, 32, 375. NRAO 300-ft at 2.7 GHz (5' :  $S = 33.8 \pm 7.0$ ).  
d'Odorico & Sabbadin 1977, AAS, 28, 439. Optical spectra.  
Read 1981, MN, 194, 863. 6C at 151 MHz (4'.4) and HMT at 1.4 GHz (2') showing H<sub>I</sub> shell.  
Lozinskaya 1981, SAL, 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 fluxes.  
Routledge *et al.* 1991, AA, 247, 529. DRAO at 1.4 GHz (1'.0 × 1'.1), including H<sub>I</sub>, plus CO observations.

## G152.2 - 1.2

RA: 04<sup>h</sup>05<sup>m</sup>30<sup>s</sup>  
Dec: +48°24'

1-GHz flux (Jy): 16?  
Spectral index: 0.7?

Size (arcmin): 110?  
Type: S?

Radio: Non-thermal source hinted by Bologna survey.

## References:

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

## G156.2 + 5.7

RA: 04<sup>h</sup>54<sup>m</sup>40<sup>s</sup>  
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, AA, 246, L28. ROSAT detection.  
Reich *et al.* 1992, AA, 256, 214. Effelsberg 100-m at 1.4 GHz (9' :  $S = 4.2 \pm 1.0$ ) and 2.7 GHz (4'.3 :  $S = 3.0 \pm 1.0$ ), plus H<sub>I</sub> and IRAS.

## G160.9 + 2.6

HB9

RA: 04<sup>h</sup>57<sup>m</sup>00<sup>s</sup>  
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: Detected.

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, AAS, 28, 439. Optical spectra.  
 Damashek *et al.* 1978, ApJ, 225, L31. Pulsar.  
 Lozinskaya 1981, SAL, 7, 17. Mean optical velocity.  
 Dwarakanath *et al.* 1982, JAA, 3, 207. Radio observations at 34.5 MHz (26' × 40' :  $S = 750 \pm 150$ ), plus review of fluxes.  
 van Gorkom *et al.* 1982, MN, 198, 757. WSRT HI absorption to nearby point source.  
 Seauquist & 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, SA, 32, 634. Observations at 12.6 and 25 MHz, plus review of fluxes.  
 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.

## G166.0 + 4.3

VRO 42.05.01

RA: 05<sup>h</sup>23<sup>m</sup>00<sup>s</sup>  
Dec: +42°52'

1-GHz flux (Jy): ??  
Spectral index: 0.4?

Size (arcmin): 55 × 35  
Type: S

Radio: Two arcs of strikingly different radii.

Optical: Nearly complete ring.

Distance: HI indicates 4.5 kpc.

## References:

- van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.  
 Willis 1973, AA, 26, 237. NRAO 300-ft at 2.7 GHz (5' :  $S = 5.2 \pm 1.0$ ).  
 Lozinskaya 1979, AJP, 32, 113. H $\alpha$  interferometry.  
 Landecker *et al.* 1982, ApJ, 261, L41. DRAO at 1.4 GHz (1'.0 × 1'.4), plus review of fluxes.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Pineault *et al.* 1985, AA, 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, AAS, 63, 345. WSRT HI Observations.  
 Landecker *et al.* 1989, MN, 237, 277. DRAO at 1.4 GHz (1'.0 × 1'.4), including HI.

## G166.2 + 2.5

OA 184

RA: 05<sup>h</sup>15<sup>m</sup>30<sup>s</sup>  
Dec: +41°50'

1-GHz flux (Jy): 11  
Spectral index: 0.5

Size (arcmin): 90 × 70  
Type: S

Radio: Large, faint shell.

Optical: Nearly complete ring.

Distance: HI indicates 4.5 kpc.

## References:

- Willis 1973, AA, 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, SAL, 7, 17. Mean optical velocity.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Routledge *et al.* 1986, MN, 221, 809. DRAO at 1.4 GHz (1' × 1'.4 :  $S = 9.0 \pm 0.5$ ) including HI, plus review of fluxes.  
 Kim *et al.* 1988, AJ, 96, 704. VLA of background sources for magnetic field structure of the remnant.  
 Leahy & Marshall 1988, MN, 235, 805. IRAS observations.  
 Landecker *et al.* 1989, MN, 237, 277. DRAO at 1.4 GHz (1'.0 × 1'.4), including HI.

**G179.0 + 2.6**

**RA:** 05<sup>h</sup>50<sup>m</sup>30<sup>s</sup>  
**Dec:** +31°05'

**1-GHz flux (Jy):** 7  
**Spectral index:** 0.4

**Size (arcmin):** 70  
**Type:** S?

**Radio:** Thick shell, with background extragalactic sources near centre.

**References:**

Fürst & Reich 1986, AA, 154, 303. Effelsberg 100-m at 1.4 (9'.4), 2.7 (4'.3) and 4.75 GHz (2'.4).  
 Fürst *et al.* 1989, AA, 223, 66. Observations of central, extragalactic source.

**G180.0 - 1.7**

S147

**RA:** 05<sup>h</sup>36<sup>m</sup>00<sup>s</sup>  
**Dec:** +27°50'

**1-GHz flux (Jy):** 65  
**Spectral index:** varies

**Size (arcmin):** 180  
**Type:** S

**Radio:** Large faint shell, with spectral break.

**Optical:** Wispy ring.

**X-ray:** Possible detection.

**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, AA, 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, AA, 115, 428. Observations of compact radio sources near the remnant.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Fürst & Reich 1986, AA, 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).  
 Sauvaget *et al.* 1990, AA, 227, 183. EXOSAT possible detection.

## G184.6 - 5.8

Crab Nebula, 3C144, SN1054

RA: 05<sup>h</sup>31<sup>m</sup>30<sup>s</sup>

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, AA, 44, 187. Effelsberg 100-m at 15.0 GHz (58" :  $S = 499.3 \pm 1.0$ ).  
 Clark *et al.* 1983, MN, 204, 415. 3-D optical structure.  
 Velusamy 1984, Nature, 308, 251. VLA at 1.4 GHz, radio detection of "jet".  
 Harnden & Seward 1984, ApJ, 283, 279. X-ray observations.  
 Velusamy 1985, MN, 212, 359. VLA at 1.4 GHz (15").  
 Aller & Reynolds 1985, ApJ, 293, L73. Flux density decrease.  
 Mezger *et al.* 1986, AA, 167, 145. 249-GHz map (120").  
 Fesen & Gull 1986, ApJ, 306, 259. Deep [OIII] imagery of "jet".  
 Morsi & Reich 1987, AAS, 69, 533. Effelsberg 100-m at 32 GHz (26".5 :  $S < 417$ ).  
 Marcelin *et al.* 1990, AA, 228, 471. Optical of "jet".  
 Fesen & Blair 1990, ApJ, 351, L45. Optical identification of dust in filaments.  
 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).  
 Velusamy & Roshi 1991, Current Science, 60, 120. OSRT at 327 MHz (33" × 56") and VLA at 327 MHz (5"), 1.4 (5") and 5 GHz (4").  
 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, AA, 251, L31. Limits on optical variations.  
 Velusamy *et al.* 1992, MN, 255, 210. VLA at 327 MHz, 1.4 and 4.8 GHz at multiple epochs, for spectral index and proper motion studies.  
 Hennessy *et al.* 1992, ApJ, 395, L13. UV imagery.  
 Blair *et al.* 1992, ApJ, 399, 61. Far UV observations.  
 Fesen *et al.* 1992, ApJ, 399, 599. Optical studies of "dark bays".  
 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, Nature, 358, 654. IRAS observations.

## G189.1 + 3.0

IC443, 3C157

RA: 06<sup>h</sup>14<sup>m</sup>00<sup>s</sup>  
Dec: +22°36'

1-GHz flux (Jy): 160  
Spectral index: 0.36

Size (arcmin): 45  
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, AA, 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, SAL, 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 fluxes.
- Braun & Strom 1986, AA, 164, 193. WSRT at 327 MHz ( $72'' \times 185''$ ) and 1.4 GHz ( $17'' \times 43''$ ), plus HI and IRAS.
- Green 1986, MN, 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, AA, 173, 337. Observations of shocked molecular species.
- Graham *et al.* 1987, ApJ, 313, 847. IR spectroscopy.
- Burton *et al.* 1988, MN, 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 O<sub>2</sub>.
- Moorhouse *et al.* 1991, MN, 253, 662. Observations of shock molecular H<sub>2</sub>.
- 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.
- Dickman *et al.* 1992, ApJ, 400, 203. Observations of shocked molecular species.

## G192.8 - 1.1

PKS 0607+17

RA: 06<sup>h</sup>06<sup>m</sup>30<sup>s</sup>  
Dec: +17°20'

1-GHz flux (Jy): 20?  
Spectral index: 0.6?

Size (arcmin): 78  
Type: S

Has been called G193.3–1.5. Has also 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, AJP, 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<sup>h</sup>36<sup>m</sup>00<sup>s</sup>  
Dec: +06°30'

1-GHz flux (Jy): 160  
Spectral index: 0.5

Size (arcmin): 220  
Type: S

**Radio:** In complex region, parts may be HII regions.

**Optical:** Large ring, near Rosette nebula.

**X-ray:** Possibly detected.

**Distance:** Mean optical velocity suggests 0.8 kpc, low frequency radio absorption suggests 1.6 kpc.

**References:**

- Milne & Dickel 1974, AJP, 27, 549. Parkes 64-m at 2.7 GHz (9').  
Velusamy & Kundu 1974, AA, 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, AAS, 31, 271. Deep optical plates.  
Lozinskaya 1981, SAL, 7, 17. Mean optical velocity.  
Graham *et al.* 1982, AA, 109, 145. Effelsberg 100-m at 2.7 GHz (4'.4 :  $S = 97.6 \pm 12.5$ ), plus review of fluxes.  
Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
Leahy *et al.* 1986, MN, 220, 501. IPC observations.  
Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz (24', 19' and 16').

**G206.9 + 2.3**

PKS 0646+06

RA: 06<sup>h</sup>46<sup>m</sup>00<sup>s</sup>  
Dec: +06°30'

1-GHz flux (Jy): 6  
Spectral index: 0.5

Size (arcmin): 60 × 40  
Type: S?

**Radio:** Diffuse source near the Monoceros Nebula.

**Optical:** Filaments detected.

**X-ray:** Possibly detected.

**References:**

- Davies & Meaburn 1978, AA, 69, 443. Optical.  
Nousek *et al.* 1981, ApJ, 248, 152. HEAO-1 X-ray limit.  
Graham *et al.* 1982, AA, 109, 145. Effelsberg 100-m at 2.7 GHz (4'.4 :  $S = 4.1 \pm 0.6$ ), plus review of fluxes.  
Rosado 1982, RMex, 5, 127. Optical.  
Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
Leahy *et al.* 1986, MN, 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<sup>h</sup>43<sup>m</sup>10<sup>s</sup>  
Dec: +00°24'

1-GHz flux (Jy): 15?  
Spectral index: 0.5?

Size (arcmin): 70?  
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, AA, 77, 93. Bologna at 408 MHz (4'.2 × 110' :  $S = 23 \pm 20\%$ ).

**G240.9 - 0.9**

RA: 07<sup>h</sup>40<sup>m</sup>30<sup>s</sup>  
Dec: -25°06'

1-GHz flux (Jy): 24?  
Spectral index: 0.1?

Size (arcmin): 95?  
Type: S?

**Radio:** Non-thermal source hinted by Bologna Survey.

**References:**

- Bonsignori-Facondi & Tomasi 1979, AA, 77, 93. Bologna at 408 MHz (4'.2 × 110' :  $S = 27 \pm 15\%$ ).



## G260.4 - 3.4

Puppis A, MSH 08-44

RA: 08<sup>h</sup>20<sup>m</sup>30<sup>s</sup>  
Dec: -42°50'

1-GHz flux (Jy): 130  
Spectral index: 0.5

Size (arcmin): 60 × 50  
Type: S

**Radio:** Angular shell, brightest to the E, poorly defined to the W.

**Optical:** Nebulosity and wisps.

**X-ray:** Brightest to the E.

**References:**

- Green 1971, AJP, 24, 773. Molonglo at 408 MHz (3' :  $S = 198 \pm 20$ ).  
 Goudis & Meaburn 1978, AA, 62, 283. H $\alpha$ +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, MN, 204, 237. FIRST at 1415 MHz (50''), large scale emission missing.  
 Teske & Petre 1987, ApJ, 318, 370. Coronal optical line emission.  
 Dubner & Arnal 1988, AAS, 75, 363. HI and CO observations of surroundings.  
 Arendt *et al.* 1990, ApJ, 350, 266. MOST at 843 MHz (44'' × 65''), with large scale emission added, plus IR, optical and X-ray observations.  
 Dubner *et al.* 1991, AJ, 101, 1466. VLA at 327 MHz (43'' × 73'') and 1.5 GHz (43'' × 77'').  
 Arendt *et al.* 1991, ApJ, 368, 474. Infrared observations.  
 Milne *et al.* 1993, MN, 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.

## G261.9 + 5.5

RA: 09<sup>h</sup>02<sup>m</sup>20<sup>s</sup>  
Dec: -38°30'

1-GHz flux (Jy): 10?  
Spectral index: 0.4?

Size (arcmin): 40 × 30  
Type: S

**Radio:** Faint shell with little limb brightening.

**References:**

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

**G263.9 - 3.3**

Vela (XYZ)

RA: 08<sup>h</sup>32<sup>m</sup>30<sup>s</sup>

1-GHz flux (Jy): 1750

Size (arcmin): 255

Dec: -45°35'

Spectral index: varies

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 central nebula and pulsar.

**Point sources:** Pulsar within Vela X.

**Distance:** Vela pulsar implies 0.5 kpc.

**References:**

Milne 1968, AJP, 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. Some optical line ratios.

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

Milne 1980, AA, 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, AA, 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, JAA, 12, 199. GEETEE at 34.5 MHz (26' x 84' :  $S = 1800$  for Vela X and  $S = 3900$  for Vela YZ), plus review of fluxes.

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, MN, 254, 139. Hard X-ray observations.

Dubner *et al.* 1992, AAS, 96, 505. Argentine 30-m at 1.4 GHz (30') of surrounding H<sub>I</sub>.

**G279.0 + 1.1**RA: 09<sup>h</sup>56<sup>m</sup>00<sup>s</sup>

1-GHz flux (Jy): 30?

Size (arcmin): 95

Dec: -53°00'

Spectral index: 0.6?

Type: S

**Radio:** Faint, incomplete shell.

**Point sources:** Pulsar nearby.

**References:**

Woermann & Jonas 1988, MN, 234, 971. Hartesbeesthoek 26-m at 1.6 (30' :  $S = 25.2 \pm 4$ ) and 2.3 GHz (20' :  $S = 20.7 \pm 3$ ).

**G284.3 - 1.8**

MSH 10-53

RA: 10<sup>h</sup>16<sup>m</sup>30<sup>s</sup>

1-GHz flux (Jy): 11?

Size (arcmin): 24?

Dec: -58°45'

Spectral index: 0.3?

Type: S

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

**References:**

Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz (43'' x 50'') and Parkes 64-m at 8.4 GHz (3' :  $S = 5.4 \pm 0.8$ ) including polarization, plus earlier fluxes.

## G290.1 - 0.8

MSH 11-61A

RA: 11<sup>h</sup>01<sup>m</sup>00<sup>s</sup>  
Dec: -60°40'

1-GHz flux (Jy): 42  
Spectral index: 0.4

Size (arcmin): 15 × 10  
Type: S

Radio: Elongated, clumpy shell.

Optical: Filaments detected.

X-ray: Detected.

## References:

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 :  $S = 20.2$ ).  
Elliot & Malin 1979, MN, 186, 45P. Optical image and spectra.  
Kirshner & Winkler 1979, ApJ, 227, 853. Optical.  
Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 50'').  
Milne *et al.* 1989, PASA, 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.

## G291.0 - 0.1

(MSH 11-62)

RA: 11<sup>h</sup>09<sup>m</sup>45<sup>s</sup>  
Dec: -60°22'

1-GHz flux (Jy): 16  
Spectral index: 0.29

Size (arcmin): 10  
Type: F

Radio: Elongated, filled-centre.

X-ray: Centrally brightened.

## References:

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Roger *et al.* 1986, MN, 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.

## G292.0 + 1.8

MSH 11-54

RA: 11<sup>h</sup>22<sup>m</sup>20<sup>s</sup>  
Dec: -59°00'

1-GHz flux (Jy): 15  
Spectral index: 0.4

Size (arcmin): 12 × 8  
Type: C?

Radio: Centrally brightened source surrounded by a plateau of faint emission.

Optical: Oxygen rich.

X-ray: Ring of emission.

## References:

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Goss *et al.* 1979, MN, 188, 357. Optical spectra.  
Lockhart *et al.* 1977, MN, 179, 147. Fleurs at 1415 MHz (50'' :  $S = 13.0$ ).  
Clark *et al.* 1980, MN, 193, 129. SSS spectrum.  
Tuohy *et al.* 1982, ApJ, 260, L65. HRI observations.  
Braun *et al.* 1983, in IAU101, p159. Optical spectra.  
Dopita & Tuohy 1984, ApJ, 282, 135. Optical spectra.  
Braun *et al.* 1986, AA, 162, 259. MOST at 843 MHz (0'.8) and IRAS.  
Claas 1988, in Birthevents, p146. EXOSAT observations.

## G293.8 + 0.6

RA: 11<sup>h</sup>32<sup>m</sup>40<sup>s</sup>  
Dec: -60°37'

1-GHz flux (Jy): 5.5?  
Spectral index: 0.6?

Size (arcmin): 20  
Type: C

Radio: Central source, with faint extended plateau.

## References:

Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 9.0$ ) and Parkes 64-m at 5 GHz (4' :  $S = 2.1$ ).  
Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 51'').

**G296.1 - 0.5**

<b>RA:</b> 11 <sup>h</sup> 48 <sup>m</sup> 40 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 8?	<b>Size (arcmin):</b> 33?
<b>Dec:</b> -62°17'	<b>Spectral index:</b> 0.6?	<b>Type:</b> S

Incorporates the previously catalogued remnant G296.1-0.7. Has also been called G296.05-0.50.

**Radio:** A ring of emission confused by nearby HII regions.

**Optical:** Detected.

**X-ray:** Detected.

**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 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.

**G296.5 + 10.0**

PKS 1209-51/52

<b>RA:</b> 12 <sup>h</sup> 07 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 48	<b>Size (arcmin):</b> 90 × 65
<b>Dec:</b> -52°10'	<b>Spectral index:</b> 0.5	<b>Type:</b> 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, AJP, 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, MN, 225, 199. EXOSAT of the west of the remnant, including the compact source.

Kesteven & Caswell 1987, AA, 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.

**G296.8 - 0.3**

1156-62

<b>RA:</b> 11 <sup>h</sup> 56 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 9	<b>Size (arcmin):</b> 14
<b>Dec:</b> -62°18'	<b>Spectral index:</b> 0.6	<b>Type:</b> S

**Radio:** Shell, brighter to the NW.

**References:**

Caswell *et al.* 1975, AJPAS, 37, 39. Molonglo at 408 MHz (3' :  $S = 15.0$ ) and Parkes 64-m at 5 GHz (4' :  $S = 3.2$ ).

Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

**G298.5 - 0.3**

<b>RA:</b> 12 <sup>h</sup> 10 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux (Jy):</b> 5	<b>Size (arcmin):</b> 5?
<b>Dec:</b> -62°35'	<b>Spectral index:</b> 0.4	<b>Type:</b> ?

**Radio:** Not well resolved, may be part of a larger ring?

**References:**

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

**G298.6 - 0.0**

RA: 12<sup>h</sup>11<sup>m</sup>00<sup>s</sup>  
Dec: -62°20'

1-GHz flux (Jy): 4.3  
Spectral index: 0.3

Size (arcmin): 12 × 8?  
Type: S

Has been called G298.6-0.1.

Radio: Elongated shell, not well defined.

**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44" × 50").

**G299.0 + 0.2**

RA: 12<sup>h</sup>15<sup>m</sup>00<sup>s</sup>  
Dec: -62°12'

1-GHz flux (Jy): 9?  
Spectral index: ?

Size (arcmin): 11?  
Type: S?

Radio: Possible shell, with thermal peak to the S, poorly defined.

**References:**

Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' : S = 12.6) and Parkes 64-m at 5 GHz (4' : S = 4.7).

**G302.3 + 0.7**

RA: 12<sup>h</sup>42<sup>m</sup>55<sup>s</sup>  
Dec: -61°52'

1-GHz flux (Jy): 5.5  
Spectral index: 0.4

Size (arcmin): 15  
Type: S

Radio: Shell, brightest to the NE and SW.

**References:**

Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' : S = 7.5) and Parkes 64-m at 5 GHz (4' : S = 3.0).

**G304.6 + 0.1**

Kes 17

RA: 13<sup>h</sup>02<sup>m</sup>50<sup>s</sup>  
Dec: -62°26'

1-GHz flux (Jy): 14  
Spectral index: 0.5

Size (arcmin): 8?  
Type: S?

Radio: Incomplete shell, not well resolved.

Distance: Possible limit of >9.7 kpc from HI absorption.

**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 : S = 6.9).  
Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.

**G308.8 - 0.1**

RA: 13<sup>h</sup>39<sup>m</sup>00<sup>s</sup>  
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, AJPAS, 37, 1. Molonglo at 408 MHz (3' : S = 16.7) and Parkes 64-m at 5 GHz (4' : S = 7.0).  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 : S = 6.5).  
Caswell *et al.* 1981, MN, 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.

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**G309.2 - 0.6****RA:** 13<sup>h</sup>43<sup>m</sup>00<sup>s</sup>**Dec:** -62°39'**1-GHz flux (Jy):** 7?**Spectral index:** 0.4?**Size (arcmin):** 17 × 13**Type:** S

Has been called G309.2-0.7.

**Radio:** Distorted shell.**References:**Clark *et al.* 1975, AJPAS, 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, MN, 195, 89. FIRST at 1415 MHz (1' 5).

Kesteven &amp; Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 50'').

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**G309.8 + 0.0****RA:** 13<sup>h</sup>47<sup>m</sup>00<sup>s</sup>**Dec:** -61°50'**1-GHz flux (Jy):** 17**Spectral index:** 0.5**Size (arcmin):** 24**Type:** S**Radio:** Incomplete shell.**Point sources:** Steep radio spectrum source near the centre of the remnant.**References:**Clark *et al.* 1975, AJPAS, 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, MN, 190, 881. FIRST at 1415 MHz (1').

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**G311.5 - 0.3****RA:** 14<sup>h</sup>02<sup>m</sup>00<sup>s</sup>**Dec:** -61°44'**1-GHz flux (Jy):** 3.7**Spectral index:** 0.5**Size (arcmin):** 3?**Type:** ?**Radio:** Not well resolved.**References:**

Shaver &amp; Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

Caswell &amp; Barnes 1985, MN, 216, 753. Molonglo at 408 MHz (3').

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**G312.4 - 0.4****RA:** 14<sup>h</sup>09<sup>m</sup>20<sup>s</sup>**Dec:** -61°29'**1-GHz flux (Jy):** 44?**Spectral index:** 0.3?**Size (arcmin):** 36 × 27**Type:** S**Radio:** Incomplete shell.**References:**Caswell & Barnes 1985, MN, 216, 753. Molonglo at 408 MHz (3' :  $S = 56$ ).

**G315.4 - 2.3**

RCW 86, MSH 14-63

RA: 14<sup>h</sup>39<sup>m</sup>00<sup>s</sup>  
Dec: -62°17'1-GHz flux (Jy): 49  
Spectral index: 0.6Size (arcmin): 40  
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, AJPAS, 37, 39. Molonglo at 408 MHz (3' :  $S = 86$ ) and Parkes 64-m at 5 GHz (4' :  $S = 18.2$ ).  
 Dickel & Milne 1976, AJP, 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, MN, 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, AA, 183, 118. MOST at 843 MHz (44" x 50").  
 Long & Blair 1990, ApJ, 358, L13. Balmer dominated optical filaments.  
 Greidamus & Strom 1990, AA, 240, 385. IRAS observations.  
 Kaastra *et al.* 1992, AA, 264, 654. Ginga X-ray spectra.

**G315.4 - 0.3**RA: 14<sup>h</sup>32<sup>m</sup>10<sup>s</sup>  
Dec: -60°23'1-GHz flux (Jy): 8  
Spectral index: 0.4Size (arcmin): 15 x 10  
Type: S

Radio: Faint shell? with HII region superposed to the E.

**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 195, 89. FIRST at 1415 MHz (50" :  $S = 6.25$ ), re-assessment of earlier fluxes.

**G316.3 - 0.0**

(MSH 14-57)

RA: 14<sup>h</sup>37<sup>m</sup>40<sup>s</sup>  
Dec: -59°47'1-GHz flux (Jy): 24  
Spectral index: 0.4Size (arcmin): 25 x 15  
Type: S

Radio: Distorted shell, with possible "blowout".

Distance: HI absorption data suggests &gt;7.2 kpc.

**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
 Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 :  $S = 16.7$ ).  
 Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44" x 51").  
 Milne *et al.* 1988, in Birthevents, p98. MOST at 843 MHz (43" x 49" :  $S = 19.0 \pm 3.0$ ), and Parkes 64-m at 5 (4'.6 :  $S = 14.7 \pm 2.0$ ) and 8.4 GHz (3'.0 :  $S = 11.6 \pm 1.5$ ), including polarization.

**G318.9 + 0.4**RA: 14<sup>h</sup>54<sup>m</sup>40<sup>s</sup>  
Dec: -58°17'1-GHz flux (Jy): 3.5?  
Spectral index: 0.1?Size (arcmin): 30 x 20?  
Type: ?

Possibly not a SNR?

Radio: Complex arcs.

**References:**

Whiteoak 1990, Nature, 347, 157. MOST at 843 MHz (43" x 51").

**G320.4 - 1.2**

MSH 15-52, RCW 89

RA: 15<sup>h</sup>10<sup>m</sup>30<sup>s</sup>  
Dec: -58°58'1-GHz flux (Jy): 60?  
Spectral index: 0.4?Size (arcmin): 30  
Type: C

Possibly the remnant of the SN of AD185?

**Radio:** Ragged shell.**Optical:** RCW 89 is the H $\alpha$  emitting region to the NW.**X-ray:** Partial shell, central nebula and pulsar.**Point sources:** Radio and X-ray pulsar, plus IR compact source.**Distance:** HI absorption indicates 4.2 kpc.**References:**Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.

Dickel &amp; Milne 1976, AJP, 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, MN, 195, 89. FIRST at 1415 MHz (50").

Seward &amp; Harnden 1982, ApJ, 256, L45. X-ray of pulsar.

Manchester *et al.* 1982, ApJ, 262, L31. Radio of pulsar.Manchester & Durdin 1983, in IAU101, p421. MOST at 843 MHz (43"  $\times$  50").Seward *et al.* 1983, ApJ, 267, 698. X-ray, Optical and IR.

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

Seward *et al.* 1984, ApJ, 281, 650. X-ray observations of pulsar and nebulosity.Trussoni *et al.* 1990, AA, 234, 403. EXOSAT observations.

Asaoka &amp; Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.

Arendt 1991, AJ, 101, 2160. IRAS observations, including compact source.

**G321.9 - 0.3**RA: 15<sup>h</sup>16<sup>m</sup>45<sup>s</sup>  
Dec: -57°23'1-GHz flux (Jy): 13  
Spectral index: 0.3Size (arcmin): 30  $\times$  20  
Type: S**Radio:** Shell brighter to the NW.**References:**Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 18.3$ ) and Parkes 64-m at 5 GHz (4' :  $S = 7.8$ ).Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44"  $\times$  52").**G322.5 - 0.1**RA: 15<sup>h</sup>19<sup>m</sup>30<sup>s</sup>  
Dec: -56°55'1-GHz flux (Jy): 1.9  
Spectral index: 0.3?Size (arcmin): 15  
Type: C**Radio:** Shell with central extended source.**References:**Whiteoak 1992, MN, 256, 121. MOST at 843 MHz (43"  $\times$  52" :  $S = 2.0 \pm 0.3$ ).**G323.5 + 0.1**RA: 15<sup>h</sup>24<sup>m</sup>50<sup>s</sup>  
Dec: -56°11'1-GHz flux (Jy): 3?  
Spectral index: 0.4?Size (arcmin): 10?  
Type: S**Radio:** Shell, confused with thermal emission.**References:**Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 4.2$ ) and Parkes 64-m at 5 GHz (4' :  $S = 1.5$ ).



## G326.3 - 1.8

MSH 15-56

RA: 15<sup>h</sup>49<sup>m</sup>00<sup>s</sup>  
Dec: -56°00'

1-GHz flux (Jy): 145  
Spectral index: varies

Size (arcmin): 36  
Type: C

Has been called G326.2-1.7.

Radio: Shell, with flat spectrum core.

Optical: Emission around the shell.

X-ray: Detected.

## References:

- Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz ( $3' : S = 180$ ).  
 Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
 Milne *et al.* 1979, MN, 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, AAS, 38, 39. Optical observations.  
 Dennefeld 1980, PASP, 92, 603. Optical spectra.  
 Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz ( $44'' \times 53''$ ).  
 Milne *et al.* 1989, PASA, 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.

## G327.1 - 1.1

RA: 15<sup>h</sup>50<sup>m</sup>30<sup>s</sup>  
Dec: -55°00'

1-GHz flux (Jy): 8?  
Spectral index: ?

Size (arcmin): 14?  
Type: S?

Radio: Possible shell, but low and high frequency maps disagree.

X-ray: Detected.

## References:

- Milne & Dickel 1974, AJP, 27, 549. Parkes 64-m at 2.7 GHz ( $8'.4 : S = 10 \pm 15\%$ ).  
 Clark *et al.* 1975, AJPAS, 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.

## G327.4 + 0.4

Kes 27

RA: 15<sup>h</sup>44<sup>m</sup>30<sup>s</sup>  
Dec: -53°40'

1-GHz flux (Jy): 34  
Spectral index: 0.6

Size (arcmin): 20  
Type: S

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

Radio: Partial shell, brightest to the SE.

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

## References:

- Caswell *et al.* 1975, AJPAS, 37, 39. Molonglo at 408 MHz ( $3' : S = 58$ ) and Parkes 64-m at 5 GHz ( $4' : S = 12.4$ ).  
 Dickel & Milne 1976, AJP, 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, AA, 183, 118. MOST at 843 MHz ( $44'' \times 55''$ ).  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz ( $43'' \times 53'' : S = 32.2 \pm 6$ ), and Parkes 64-m at 8.4 GHz ( $3' : S = 9.4 \pm 0.8$ ), including polarization.

**G327.6 + 14.6**

SN1006, PKS 1459-41

RA: 14<sup>h</sup>59<sup>m</sup>35<sup>s</sup>

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 $\alpha$  component.

**X-ray:** Shell, limb brightened as in radio.

**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, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).

Pskovskii 1978, SA, 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, MN, 194, 569. IPC observations.

Caswell *et al.* 1983, MN, 204, 921. FIRST at 1415 MHz (77").

Reynolds & Gilmore 1986, AJ, 92, 1138. VLA at 1.37 and 1.67 GHz (16" x 20").

Kirshner *et al.* 1987, ApJ, 315, L135. Broad H $\alpha$  optical component.

Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44" x 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" x 66" :  $S = 17.5 \pm 1.5$ ).

Long *et al.* 1988, ApJ, 333, 749. Optical proper motion for distance.

Jones & Pye 1989, MN, 238, 567. EXOSAT observations.

Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.

**G328.0 + 0.3**RA: 15<sup>h</sup>49<sup>m</sup>30<sup>s</sup>

1-GHz flux (Jy): 2.4?

Size (arcmin): 6?

Dec: -53°20'

Spectral index: 0.6?

Type: ?

**Radio:** Not well resolved.

**References:**

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

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

**G328.4 + 0.2**

(MSH 15-57)

RA: 15<sup>h</sup>51<sup>m</sup>40<sup>s</sup>

1-GHz flux (Jy): 16

Size (arcmin): 6

Dec: -53°08'

Spectral index: 0.2

Type: F

**Radio:** Amorphous emission.

**References:**

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

Caswell *et al.* 1980, MN, 190, 881. FIRST at 1415 MHz (50").

Wilson 1986, ApJ, 302, 718. Lack of detection with IPC.

**G330.0 + 15.0**

Lupus Loop

RA: 15<sup>h</sup>05<sup>m</sup>00<sup>s</sup>  
Dec: -39°30'1-GHz flux (Jy): 350?  
Spectral index: 0.5?Size (arcmin): 180?  
Type: S**Radio:** Low surface brightness loop with HI shell.**X-ray:** Detected.**References:**

Milne 1971, AJP, 24, 757. Parkes 64-m at 408 MHz (48'), 635 MHz (31') and 1410 MHz (15').  
 Milne & Dickel 1974, AJP, 27, 549. Parkes 64-m at 2.7 GHz (8'.4 : S = 120 ± 30%).  
 Toor 1980, AA, 85, 184. X-ray image and spectrum.  
 Colomb & Dubner 1982, AA, 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.

**G330.2 + 1.0**RA: 15<sup>h</sup>57<sup>m</sup>20<sup>s</sup>  
Dec: -51°26'1-GHz flux (Jy): 7  
Spectral index: 0.3Size (arcmin): 10  
Type: S?**Radio:** Clumpy non-thermal emission, possibly a shell.**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 204, 915. FIRST at 1415 MHz (52'' × 47''), and MOST at 843 MHz (43'' × 55'').

**G332.0 + 0.2**RA: 16<sup>h</sup>09<sup>m</sup>30<sup>s</sup>  
Dec: -50°45'1-GHz flux (Jy): 9  
Spectral index: 0.5Size (arcmin): 10  
Type: S**Radio:** Incomplete shell.**References:**

Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 57'').

**G332.4 - 0.4**

RCW 103

RA: 16<sup>h</sup>13<sup>m</sup>45<sup>s</sup>  
Dec: -50°55'1-GHz flux (Jy): 28  
Spectral index: 0.5Size (arcmin): 9  
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, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
 Tuohy & Garmire 1980, ApJ, 239, L107. HRI detection of X-ray point source.  
 Caswell *et al.* 1980, MN, 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.  
 Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum (and HRI image from Tuohy, private communication).  
 Mcaburn & Allen 1986, MN, 222, 593. Optical spectra.  
 Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 57'').  
 Oliva *et al.* 1990, AA, 240, 453. IR spectroscopy.

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<b>G332.4 + 0.1</b>		MSH 16-51, Kes 32
RA: 16 <sup>h</sup> 11 <sup>m</sup> 30 <sup>s</sup>	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: Incomplete shell, with jet and plume?

**References:**

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

Roger *et al.* 1985, Nature, 316, 44. MOST at 843 MHz (44" × 57").

Milne *et al.* 1988, in Birthevents. Parkes 64-m at 5 (4'.6 :  $S = 16.5 \pm 2.0$ ) and 8.4 GHz (3' :  $S = 13.0 \pm 1.5$ ), including polarization, plus  $S = 37 \pm 3$  at 843 MHz.

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**G335.2 + 0.1**

RA: 16 <sup>h</sup> 24 <sup>m</sup> 00 <sup>s</sup>	1-GHz flux (Jy): 18	Size (arcmin): 19
Dec: -48°40'	Spectral index: 0.5	Type: S

Radio: Well defined shell.

**References:**

Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 27.1$ ) and Parkes 64-m at 5 GHz (4' :  $S = 8.6$ ).

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**G336.7 + 0.5**

RA: 16 <sup>h</sup> 28 <sup>m</sup> 30 <sup>s</sup>	1-GHz flux (Jy): 6	Size (arcmin): 13 × 10
Dec: -47°13'	Spectral index: 0.5	Type: S

Radio: Incomplete shell.

**References:**

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

Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44" × 60").

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**G337.0 - 0.1**

(CTB 33)

RA: 16 <sup>h</sup> 32 <sup>m</sup> 10 <sup>s</sup>	1-GHz flux (Jy): 17?	Size (arcmin): 14?
Dec: -47°27'	Spectral index: 0.5?	Type: S?

Radio: Possible shell, confused by nearby thermal sources.

**References:**

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

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**G337.2 - 0.7**

RA: 16 <sup>h</sup> 35 <sup>m</sup> 45 <sup>s</sup>	1-GHz flux (Jy): 2.1	Size (arcmin): 4?
Dec: -47°45'	Spectral index: 0.7	Type: ?

Radio: Not well resolved.

**References:**

Clark *et al.* 1975, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 3.8$ ) and Parkes 64-m at 5 GHz (4' :  $S = 0.70$ ).

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<b>G337.3 + 1.0</b>		Kes 40
RA: 16 <sup>h</sup> 29 <sup>m</sup> 00 <sup>s</sup>	1-GHz flux (Jy): 16	Size (arcmin): 11
Dec: -46°30'	Spectral index: 0.5	Type: S

Radio: Nearly complete shell.

References:  
 Caswell *et al.* 1975, AJPAS, 37, 39. Molonglo at 408 MHz (3' :  $S = 24.6$ ) and Parkes 64-m at 5 GHz (4' :  $S = 7.2$ ).  
 Dickel & Milne 1976, AJP, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).  
 Kesteven & Caswell 1987, AA, 183, 118. MOST at 843 MHz (44'' × 61'').  
 Milne *et al.* 1989, PASA, 8, 187. MOST at 843 MHz (43'' × 59'' :  $S = 14.8 \pm 3.0$ ), and Parkes 64-m at 8.4 GHz (3' :  $S = 5.1 \pm 0.6$ ), including polarization.

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<b>G337.8 - 0.1</b>		Kes 41
RA: 16 <sup>h</sup> 35 <sup>m</sup> 20 <sup>s</sup>	1-GHz flux (Jy): 18	Size (arcmin): 7?
Dec: -46°53'	Spectral index: 0.5	Type: ?

Radio: Not well resolved.  
 Distance: HI absorption suggests >9.3 kpc.

References:  
 Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.

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<b>G338.1 + 0.4</b>		
RA: 16 <sup>h</sup> 34 <sup>m</sup> 20 <sup>s</sup>	1-GHz flux (Jy): 4.5	Size (arcmin): 12
Dec: -46°18'	Spectral index: 0.4	Type: S

Radio: Not well defined, in complex region.  
 Optical: Detected.

References:  
 Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Zealey *et al.* 1979, AAS, 38, 39. Optical detection.

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<b>G338.3 - 0.0</b>		
RA: 16 <sup>h</sup> 37 <sup>m</sup> 20 <sup>s</sup>	1-GHz flux (Jy): 15?	Size (arcmin): 8?
Dec: -46°28'	Spectral index: 0.7?	Type: S?

Radio: Possible shell, in complex region.

References:  
 Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

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<b>G338.5 + 0.1</b>		
RA: 16 <sup>h</sup> 37 <sup>m</sup> 30 <sup>s</sup>	1-GHz flux (Jy): 28?	Size (arcmin): 8?
Dec: -46°13'	Spectral index: 0.3?	Type: ?

Radio: In complex region, not well defined.

References:  
 Shaver & Goss 1970, AJPAS, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').

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**G340.4 + 0.4**

RA: 16<sup>h</sup>42<sup>m</sup>55<sup>s</sup>  
Dec: -44°34'

1-GHz flux (Jy): 6  
Spectral index: 0.4

Size (arcmin): 6  
Type: S

Radio: Distorted shell.

**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 203, 595. FIRST at 1415 MHz (50'').

**G340.6 + 0.3**

RA: 16<sup>h</sup>44<sup>m</sup>05<sup>s</sup>  
Dec: -44°29'

1-GHz flux (Jy): 5.1  
Spectral index: 0.4

Size (arcmin): 5  
Type: S

Radio: Incomplete shell.

Optical: Possible associated filaments.

**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 203, 595. FIRST at 1415 MHz (50'').  
Zenley *et al.* 1979, AAS, 38, 39. Optical.

**G341.9 - 0.3**

RA: 16<sup>h</sup>51<sup>m</sup>25<sup>s</sup>  
Dec: -43°56'

1-GHz flux (Jy): 3.2  
Spectral index: 0.5

Size (arcmin): 6  
Type: S

Radio: Incomplete shell.

**References:**

Caswell *et al.* 1975, AJPAS, 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, AJPAS, 37, 57 for the maps.  
Caswell *et al.* 1983, MN, 203, 595. FIRST at 1415 MHz (50''), revision of previous flux.

**G342.0 - 0.2**

RA: 16<sup>h</sup>51<sup>m</sup>15<sup>s</sup>  
Dec: -43°48'

1-GHz flux (Jy): 3.5?  
Spectral index: 0.4?

Size (arcmin): 11 × 7  
Type: S?

Radio: Faint extended source.

**References:**

Caswell *et al.* 1983, MN, 203, 595. FIRST at 1415 MHz (50''), estimate  $S(408) = 5$ ,  $S(5000) = 2$  from previous maps.

**G343.1 - 2.3**

RA: 17<sup>h</sup>04<sup>m</sup>30<sup>s</sup>  
Dec: -44°15'

1-GHz flux (Jy): 25?  
Spectral index: 0.5?

Size (arcmin): 44 × 32?  
Type: S

Radio: Incomplete shell?

Point sources: Pulsar near edge.

**References:**

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

**G344.7 - 0.1**

RA: 17<sup>h</sup>00<sup>m</sup>20<sup>s</sup>  
Dec: -41°38'

1-GHz flux (Jy): 3.0  
Spectral index: 0.5

Size (arcmin): 8?  
Type: S?

Radio: Possible shell.

## References:

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

**G346.6 - 0.2**

RA: 17<sup>h</sup>06<sup>m</sup>50<sup>s</sup>  
Dec: -40°07'

1-GHz flux (Jy): 10  
Spectral index: 0.5

Size (arcmin): 8  
Type: S

Radio: Incomplete shell.

## References:

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

**G348.5 - 0.0**

RA: 17<sup>h</sup>12<sup>m</sup>00<sup>s</sup>  
Dec: -38°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'' × 53''), 1.4 GHz (18'' × 33'') and part at 5 GHz (2''.5 × 3''.9).

**G348.5 + 0.1**

RA: 17<sup>h</sup>10<sup>m</sup>40<sup>s</sup>  
Dec: -38°29'

1-GHz flux (Jy): 72  
Spectral index: 0.3

Size (arcmin): 15  
Type: S

CTB 37A

Radio: Shell, poorly define to S and W, overlapping G348.5-0.0 in east.

Distance: HI absorption indicates 10.2±3.5 kpc.

## References:

Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz (3' :  $S = 97$ ).  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 :  $S = 43$ ).  
Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
Milne *et al.* 1979, MN, 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, MN, 210, 845. VLA at 1465 MHz (20'' × 45'').  
Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46'' × 53''), 1.4 GHz (18'' × 33'') and part at 5 GHz (2''.5 × 3''.9).

**G348.7 + 0.3**

RA: 17<sup>h</sup>10<sup>m</sup>30<sup>s</sup>  
Dec: -38°08'

1-GHz flux (Jy): 26  
Spectral index: 0.3

Size (arcmin): 10  
Type: S

CTB 37B

Radio: Incomplete shell with faint eastern extension.

Distance: HI absorption indicates 10.2±3.5 kpc.

## References:

Clark *et al.* 1975, AJPAS, 37, 75. Molonglo at 408 MHz (3' :  $S = 34$ ).  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4 :  $S = 32$ ).  
Caswell *et al.* 1975, AA, 45, 239. Parkes HI absorption.  
Milne *et al.* 1979, MN, 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, MN, 210, 845. VLA at 1465 MHz (20'' × 45'').  
Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46'' × 53'').

**G349.7 + 0.2**

RA: 17<sup>h</sup>14<sup>m</sup>35<sup>s</sup>  
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, AJPAS, 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, AA, 45, 239. Parkes HI absorption.

Shaver *et al.* 1985, Nature, 313, 113. VLA at 1.4 GHz (3".4 × 14".5).

**G350.0 - 1.8**

RA: 17<sup>h</sup>23<sup>m</sup>40<sup>s</sup>  
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, AJPAS, 37, 1. Molonglo at 408 MHz (3' :  $S = 49.5$ ) and Parkes 64-m at 5 GHz (4' :  $S = 13.6$ ).

Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz (4'.4).

**G351.2 + 0.1**

RA: 17<sup>h</sup>19<sup>m</sup>05<sup>s</sup>  
Dec: -36°08'

1-GHz flux (Jy): 5.8  
Spectral index: 0.4

Size (arcmin): 7  
Type: C

Has been called G351.3+0.2.

**Radio:** Incomplete shell, with flat-spectrum core.

**References:**

Clark *et al.* 1975, AJPAS, 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, PASA, 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.

**G352.7 - 0.1**

RA: 17<sup>h</sup>24<sup>m</sup>20<sup>s</sup>  
Dec: -35°05'

1-GHz flux (Jy): 6?  
Spectral index: 0.6?

Size (arcmin): 6 × 5  
Type: S?

**Radio:** Possible shell, not well defined, near thermal sources.

**References:**

Clark *et al.* 1975, AJPAS, 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, MN, 203, 595. FIRST at 1415 MHz (1'.1).

**G355.9 - 2.5**

RA: 17<sup>h</sup>42<sup>m</sup>35<sup>s</sup>  
Dec: -33°42'

1-GHz flux (Jy): 8  
Spectral index: 0.5

Size (arcmin): 13  
Type: S

**Radio:** Distorted shell.

**References:**

Clark *et al.* 1975, AJPAS, 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, PASA, 5, 227. MOST at 843 MHz (43" × 77").



## G357.7 - 0.1

MSH 17-39

RA: 17<sup>h</sup>37<sup>m</sup>15<sup>s</sup>  
Dec: -30°56'

1-GHz flux (Jy): 37  
Spectral index: 0.4

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, AJPAS, 37, 39. Molonglo at 408 MHz ( $3' : S = 54.2$ ) and Parkes 64-m at 5 GHz ( $4' : S = 18.5$ ).  
Milne & Dickel 1975, AJP, 28, 209. Parkes 64-m at 5 GHz ( $4'.4 : S = 14.6$ ).  
Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
Caswell *et al.* 1980, MN, 190, 881. FIRST at 1415 MHz ( $50''$ ).  
Weiler & Panagia 1980, AA, 90, 269. Effelsberg 100-m at 9 GHz ( $1'.5$ ) (private communication from Baker).  
Shaver *et al.* 1985, Nature, 313, 113. VLA at 1.4 GHz ( $3''.8 \times 10''.9$ ) and 5 GHz ( $12'' \times 26''$ ).  
Becker & Helfand 1985, Nature, 313, 115. VLA at 1.4 GHz and 5 GHz, suggest it is not a SNR, see Helfand & Becker 1985 Nature, 313, 118.  
Shaver *et al.* 1985, AA, 147, L23. Observations of peripheral compact source.  
Caswell *et al.* 1989, PASA, 8, 184. MOST at 843 MHz ( $43'' \times 83''$ ).

## G357.7 + 0.3

RA: 17<sup>h</sup>35<sup>m</sup>20<sup>s</sup>  
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, AAS, 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.

## G358.4 - 1.9

RA: 17<sup>h</sup>46<sup>m</sup>05<sup>s</sup>  
Dec: -31°16'

1-GHz flux (Jy): 12.5?  
Spectral index: 0.5?

Size (arcmin): 40 × 36  
Type: S

Radio: Asymmetric shell.

## References:

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

## G359.0 - 0.9

RA: 17<sup>h</sup>43<sup>m</sup>35<sup>s</sup>  
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, AAS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).

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**G359.1 - 0.5****RA:**  $17^{\text{h}}42^{\text{m}}20^{\text{s}}$   
**Dec:**  $-29^{\circ}56'$ **1-GHz flux (Jy):** 14  
**Spectral index:** 0.4?**Size (arcmin):** 24  
**Type:** S**Radio:** Non-thermal shell in complex region.**Point sources:** Several compact radio sources near centre.**References:**

Downes *et al.* 1979, AAS, 35, 1. From observations by Altenhoff *et al.* 1979, AAS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6 : S = 13$ ).

Reich & Fürst 1984, AAS, 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 model material.