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<b>G0.0+0.0</b>			Sgr A East
<b>RA:</b> 17 <sup>h</sup> 42 <sup>m</sup> 33 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 100?	<b>Size/arcmin:</b> 3.5 × 2.5	
<b>Dec:</b> –28°59′	<b>Spectral index:</b> 0.8?	<b>Type:</b> S	

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

**References:**

Ekers *et al.* 1983, A&A, 122, 143. VLA at 1.4 GHz and 5 GHz (both 5'' × 8''),  $S(1.4)=77$ ,  $S(5.0)=31$ .  
 Pedlar *et al.* 1989, ApJ, 342, 769. VLA at 332 MHz (12''), 1.4 GHz (1''.3 × 2''.5) and 5 GHz (1''.3 × 2''.5).  
 Mezger *et al.* 1989, A&A, 209, 337. Nearby molecular material.  
 Ho *et al.* 1991, Natur, 350, 309. VLA of NH<sub>3</sub> emission from surroundings.  
 Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz (17'' × 33'').  
 Serabyn *et al.* 1992, ApJ, 395, 166. Nearby molecular material.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 88'').  
 Yusef-Zadeh & Mehninger 1995, ApJ, 452, L37. VLA of nearby H<sub>2</sub>O masers.

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<b>G0.3+0.0</b>			
<b>RA:</b> 17 <sup>h</sup> 43 <sup>m</sup> 05 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 22	<b>Size/arcmin:</b> 15 × 8	
<b>Dec:</b> –28°37′	<b>Spectral index:</b> 0.6	<b>Type:</b> S	

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

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

**References:**

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

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<b>G0.9+0.1</b>			
<b>RA:</b> 17 <sup>h</sup> 44 <sup>m</sup> 12 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 18?	<b>Size/arcmin:</b> 8	
<b>Dec:</b> –28°08′	<b>Spectral index:</b> varies	<b>Type:</b> C	

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

**X-ray:** Central core.

**References:**

Helfand & Becker 1987, ApJ, 314, 203. VLA at 1.4 and 5 GHz, and IPC observations.  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 91'').  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Mereghetti *et al.* 1998, A&A, 331, L77. X-ray detection.

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<b>G1.0–0.1</b>			
<b>RA:</b> 17 <sup>h</sup> 46 <sup>m</sup> 20 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 15	<b>Size/arcmin:</b> 8	
<b>Dec:</b> –28°25′	<b>Spectral index:</b> 0.6?	<b>Type:</b> S	

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

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

**References:**

Downes *et al.* 1979, A&AS, 35, 1. Review of flux densities.  
 Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz (64'' × 100'' :  $S=12.3$ ).  
 Liszt 1992, ApJS, 82, 495. VLA at 1.6 GHz (13'' × 23'').  
 Gray 1994, MNRAS, 270, 835. MOST at 843 MHz (43'' × 91'').  
 Mehninger *et al.* 1998, ApJ, 493, 274. VLA at 1.6 GHz (15'' × 28'') and 5 GHz, including masers observations.

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<b>G1.4–0.1</b>			
<b>RA:</b> 17 <sup>h</sup> 46 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 2?	<b>Size/arcmin:</b> 10	
<b>Dec:</b> –27°45′	<b>Spectral index:</b> ?	<b>Type:</b> S	

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

**References:**

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

**G1.9+0.3****RA:** 17<sup>h</sup>45<sup>m</sup>37<sup>s</sup>**Dec:** –27°09′**1-GHz flux/Jy:** 0.6**Spectral index:** 0.7**Size/arcmin:** 1.2**Type:** S**Radio:** Shell, brighter to the N.**References:**

Green & Gull 1984, *Natur*, 312, 527. VLA at 5 GHz (4'' × 2'').  
 Gray 1994, *MNRAS*, 270, 835. MOST at 843 MHz (43'' × 94'').  
 Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.

**G3.7 – 0.2****RA:** 17<sup>h</sup>52<sup>m</sup>20<sup>s</sup>**Dec:** –25°50′**1-GHz flux/Jy:** 2.3**Spectral index:** 0.65**Size/arcmin:** 11 × 14**Type:** S

Hase been called G003.8–00.3.

**Radio:** Double arc.**References:**

Gray 1994, *MNRAS*, 270, 847. MOST at 843 MHz (43'' × 99'' :  $S=2.4$ ).  
 Gaensler 1998, *ApJ*, 493, 781. VLA at 1.4 GHz (9'' × 15'' :  $S=1.7 \pm 0.1$ ).

**G3.8+0.3****RA:** 17<sup>h</sup>49<sup>m</sup>50<sup>s</sup>**Dec:** –25°27′**1-GHz flux/Jy:** 4?**Spectral index:** ?**Size/arcmin:** 18**Type:** S?**Radio:** Incomplete shell.**References:**

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

**G4.2 – 3.5****RA:** 18<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, *A&AS*, 85, 633. Effelsberg 100-m at 2.7 GHz (4'.3).

**G4.5+6.8****RA:** 17<sup>h</sup>27<sup>m</sup>42<sup>s</sup>**Dec:** –21°27′**1-GHz flux/Jy:** 19**Spectral index:** 0.64

Kepler, SN1604, 3C358

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

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

**Radio:** Incomplete shell, brighter to the N.**Optical:** Faint filaments.**X-ray:** Shell, brighter to the N.**Distance:** Historical observations indicate about 4.4 kpc.**References:**

van den Bergh & Kamper 1977, *ApJ*, 218, 617. Optical proper motions.  
 Leibowitz & Danziger 1983, *MNRAS*, 204, 273. Optical spectra.  
 Danziger & Goss 1980, *MNRAS*, 190, 47P. Revision of distance.  
 White & Long 1983, *ApJ*, 264, 196. IPC observations.  
 Matsui *et al.* 1984, *ApJ*, 287, 295. VLA at 1.4 (2'' .5 × 3'' .2) and 5 GHz (3'' .2 × 4'' .8) and HRI map (5'').  
 Dickel *et al.* 1988, *ApJ*, 330, 254. VLA at 1.4 (1'' .2 × 2'' .3) and 5 GHz (0'' .6 × 1'' .0) at two epochs.  
 Smith *et al.* 1989, *ApJ*, 347, 925. EXOSAT observations.  
 Hatsukade *et al.* 1990, *PASJ*, 42, 279. X-ray spectrum.  
 Blair *et al.* 1991, *ApJ*, 366, 484. Optical imaging and spectroscopy.  
 Bandiera & van den Bergh 1991, *ApJ*, 374, 186. Optical changes.  
 van den Bergh 1991, *PASP*, 103, 194. Optical imaging.  
 Predehl & Schmitt 1995, *A&A*, 293, 889. ROSAT of dust scattered halo.  
 Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.

**G5.2 – 2.6****RA:** 18<sup>h</sup>04<sup>m</sup>25<sup>s</sup>**Dec:** –25°45′**1-GHz flux/Jy:** 2.6?**Spectral index:** 0.6?**Size/arcmin:** 18**Type:** S**Radio:** Poorly resolved shell.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).**G5.4 – 1.2****RA:** 17<sup>h</sup>59<sup>m</sup>00<sup>s</sup>**Dec:** –24°55′**1-GHz flux/Jy:** 35?**Spectral index:** 0.2?**Size/arcmin:** 35**Type:** C?

Milne 56

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

**Radio:** Incomplete shell, including wide ‘v’ of emission to east with small flat-spectrum source at apex.**Optical:** Detected.**Distance:** HI absorption suggests > 4.3 kpc.**Point sources:** Pulsar associated with flat spectrum source.**References:**Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′ : S = 38).

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

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

Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 : S = 21.9 ± 2.4).Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).Zealey *et al.* 1979, A&AS, 38, 39. Optical detection.

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

Manchester *et al.* 1985, MNRAS, 212, 975. Pulsar detection.Caswell *et al.* 1987, MNRAS, 225, 329. MOST at 843 MHz (42″ × 110″).

Frail &amp; Kulkarni 1991, Natur, 352, 785. Pulsar and remnant association.

Manchester *et al.* 1991, MNRAS, 253, 7P. Pulsar and remnant association.Milne *et al.* 1992, MNRAS, 255, 707. Parkes 64-m at 4.75 (4′.5 : S = 30.8 ± 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).

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

Biggs &amp; Lyne 1996, MNRAS, 282, 691. Pulsar search.

**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).**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

Has been called G6.1+1.15.

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

<b>G6.4 – 0.1</b>			W28
<b>RA:</b> 17 <sup>h</sup> 57 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 310	<b>Size/arcmin:</b> 42	
<b>Dec:</b> –23°25′	<b>Spectral index:</b> varies	<b>Type:</b> C	
Has been called G6.6–0.2.			
<b>Radio:</b> Several non-thermal sources in a ring, with flat spectrum core.			
<b>Optical:</b> Filaments.			
<b>X-ray:</b> Diffuse emission from most of the remnant.			
<b>Point sources:</b> Young pulsar near edge of remnant.			
<b>Distance:</b> Uncertain mean optical velocity indicates 3.5–4 kpc.			
<b>References:</b>			
Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10 GHz (3′).			
van den Bergh <i>et al.</i> 1973, ApJS, 26, 19. Optical.			
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).			
Dopita <i>et al.</i> 1977, ApJ, 214, 179. Some optical line ratios.			
Altenhoff <i>et al.</i> 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).			
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.			
Andrews <i>et al.</i> 1983, ApJ, 266, 684. VLA at 1.4 GHz (8″) 4.9 GHz (3″) and 15 GHz (1″) of central region only, plus HRI image of central region.			
Bohigas <i>et al.</i> 1983, RMxAA, 8, 155. Optical spectra.			
Odenwald <i>et al.</i> 1984, ApJ, 279, 162. Nearby IR source.			
Andrews <i>et al.</i> 1985, AJ, 90, 310. VLA of central component.			
Long <i>et al.</i> 1991, ApJ, 373, 567. IPC and optical observations.			
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.1 × 4′.4: $S=660$ ).			
Kaspi <i>et al.</i> 1993, ApJ, 409, L57. Pulsar association.			
Frail <i>et al.</i> 1993, Natur, 365, 136. VLA at 327 MHz (smoothed to 65″), plus pulsar association.			
Frail <i>et al.</i> 1994, ApJ, 424, L111. VLA of associated OH masers.			
Esposito <i>et al.</i> 1996, ApJ, 461, 820. Possible associated $\gamma$ -ray emission.			
Frail <i>et al.</i> 1996, AJ, 111, 1651. OH maser emission.			
Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.			
Claussen <i>et al.</i> 1997, ApJ, 489, 143. VLA of OH masers.			
<b>G6.4+4.0</b>			
<b>RA:</b> 17 <sup>h</sup> 42 <sup>m</sup> 10 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 1.3?	<b>Size/arcmin:</b> 31	
<b>Dec:</b> –21°20′	<b>Spectral index:</b> 0.4?	<b>Type:</b> S	
<b>Radio:</b> Faint asymmetric shell.			
<b>References:</b>			
Reich <i>et al.</i> 1988, in SNRISM, p293. Effelsberg 100-m at 2.7 GHz (4′.3).			
<b>G7.7 – 3.7</b>			1814–24
<b>RA:</b> 18 <sup>h</sup> 14 <sup>m</sup> 20 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 11	<b>Size/arcmin:</b> 22	
<b>Dec:</b> –24°05′	<b>Spectral index:</b> 0.32	<b>Type:</b> S	
<b>Radio:</b> Shell, with high polarization.			
<b>References:</b>			
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).			
Milne <i>et al.</i> 1986, MNRAS, 223, 487. MOST at 843 MHz (44″ × 108″) and Parkes 64-m at 8.4 GHz (3′: $S=4.6\pm 0.5$ ), with polarization, plus review of flux densities.			
Dubner <i>et al.</i> 1996, AJ, 111, 1304. VLA at 1.4 GHz (70″ × 35″: $S=9.9\pm 0.1$ ), including polarization.			
<b>G8.7 – 5.0</b>			
<b>RA:</b> 18 <sup>h</sup> 21 <sup>m</sup> 05 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 4.4	<b>Size/arcmin:</b> 26	
<b>Dec:</b> –23°50′	<b>Spectral index:</b> 0.3	<b>Type:</b> S	
<b>Radio:</b> Asymmetric shell.			
<b>References:</b>			
Reich <i>et al.</i> 1988, in SNRISM, p293. Summary of parameters.			
Reich <i>et al.</i> 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).			

**G8.7 – 0.1**

(W30)

**RA:** 18<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.**X-ray:** Northern edge detected.**Point sources:** Pulsar inside western edge.**References:**Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz ( $7'.2 \times 9'.7$ :  $S=190 \pm 50$ ).Kassim & Weiler 1990, Natur, 343, 146. VLA at 327 MHz ( $3'.0 \times 3'.7$ ).Kassim & Weiler 1990, ApJ, 360, 184. VLA at 327 MHz ( $2'.8 \times 4'.1$ :  $S=129 \pm 11$ ), and part at 1.4 GHz ( $0'.9 \times 1'.8$ ), plus review of flux densities.Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz ( $37'' \times 55''$ ).

Finley &amp; Ögelman 1994, ApJ, 434, L25. ROSAT observations, including pulsar.

**G9.8 + 0.6****RA:** 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, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).Caswell 1983, MNRAS, 204, 833. Molonglo at 408 MHz ( $3'$ :  $S=5.8 \pm 0.6$ ).Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ( $41'' \times 63''$ :  $S=3.5 \pm 0.4$ ).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**G10.0 – 0.3****RA:** 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:** ?**Radio:** Not well resolved.**X-ray:** X-ray pulsar.**Point sources:** X-ray pulsar associated with soft gamma repeater.**Distance:** Association with W31 gives 14.5 kpc.**References:**Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz ( $3'$ ) and Parkes 64-m at 5 GHz ( $4'$ ).Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).Kulkarni & Frail 1993, Natur, 365, 33. VLA at 330 MHz (smoothed to  $2'$ ) and 1.49 GHz ( $40'' \times 65''$ ), including association with soft gamma repeater.Sonobe *et al.* 1994, ApJ, 436, L23. X-ray observations.Kulkarni *et al.* 1994, Natur, 368, 129. VLA at 1.4 GHz ( $31''$ ) and 8.4 GHz ( $5''.5$ )Vasisht *et al.* 1995, ApJ, 440, L65. Radio monitoring of core.Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.Corbel *et al.* 1997, ApJ, 478, 624. CO observations of surroundings.Frail *et al.* 1997, ApJ, 480, L129. VLA monitoring of changing core.Kouveliotou *et al.* 1998, Natur, 393, 235. X-ray pulsar detection.

**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:** 0.49

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

Probably associated with the SN of AD386.

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

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

**Point sources:** Central pulsar.

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Radhakrishnan *et al.* 1972, ApJS, 24, 49. HI absorption.  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20″ × 25″) and HRI observations, with review of flux densities.  
 Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz, plus HI absorption, HRI and IPC observations.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (26″.5 : S = 4.04 ± 0.24).  
 Green *et al.* 1988, MNRAS, 231, 735. VLA at 1.4 and 5 GHz.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.2 × 4′.1 : S = 39).  
 Reynolds *et al.* 1994, MNRAS, 271, L1. ROSAT image and spectra.  
 Vasisht *et al.* 1996, ApJ, 456, L59. ASCA observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Torii *et al.* 1997, ApJ, 489, L145. ASCA detection of pulsar.

**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:** 0.5

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

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

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 9.4) contaminated by sidelobes of a nearby source, and Parkes 64-m at 5 GHz (4′ : S = 2.8).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 : S = 2.0 ± 0.4).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.2 × 4′.1 : S = 18).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (44″ × 63″ : S = 5.1 ± 0.6).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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:** 0.7

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

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

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S = 6.6) and Parkes 64-m at 5 GHz (4′ : S = 1.1).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.2 × 4′.1).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (41″ × 61″ : S = 0.7).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G13.3 – 1.3**

**RA:** 18<sup>h</sup>16<sup>m</sup>30<sup>s</sup>  
**Dec:** –18°01′

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

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

**Radio:** Amorphous emission.

**X-ray:** Elongated emission.

**Optical:** Filaments in S.

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

**References:**

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

**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 ( $15'' : S=2.67\pm 0.5$ ).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**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, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).**G15.9+0.2****RA:** 18<sup>h</sup>16<sup>m</sup>00<sup>s</sup>**Dec:** –15°03′**1-GHz flux/Jy:** 5**Spectral index:** 0.6?**Size/arcmin:** 7 × 5**Type:** S?**Radio:** Incomplete shell, with bright concentration to the E.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=7.7$ ) and Parkes 64-m at 5 GHz (4′ :  $S=1.9$ ).Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 :  $S=1.1\pm 0.2$ ).Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz (58′ × 44′).Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz (77′ × 61′ :  $S=11.2\pm 1.0$ ), 1.4 GHz (23′ × 14′ :  $S=3.9\pm 0.1$ ) and 4.9 GHz (13′ × 16′).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**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 ( $S=0.95$ ) and 1.4 GHz ( $15'' : S=2.43$ ) and OSRT at 327 MHz ( $S=5.13$ ).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including masers.**G16.8–1.1****RA:** 18<sup>h</sup>22<sup>m</sup>30<sup>s</sup>**Dec:** –14°48′**1-GHz flux/Jy:** ??**Spectral index:** ?**Size/arcmin:** 30 × 24?**Type:** ?

Has been called G16.85–1.05.

**Radio:** Overlapping thermal and non-thermal emission, parameters uncertain.**Point sources:** Pulsar within boundary of non-thermal emission.**References:**Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2′.4), plus other observations.

**G17.4 – 2.3****RA:** 18<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, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**G17.8 – 2.6****RA:** 18<sup>h</sup>30<sup>m</sup>00<sup>s</sup>**Dec:** –14°41′**1-GHz flux/Jy:** 4.0?**Spectral index:** 0.3?**Size/arcmin:** 24**Type:** S**Radio:** Well defined shell.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**G18.8+0.3****RA:** 18<sup>h</sup>21<sup>m</sup>10<sup>s</sup>**Dec:** –12°25′**1-GHz flux/Jy:** 33**Spectral index:** 0.4**Size/arcmin:** 17 × 11**Type:** S

Kes 67

Has been called G18.9+0.3.

**Radio:** Incomplete shell, in complex region near the HII region W39.**Distance:** HI absorption indicates > 9.5 kpc, and possibly < 19 kpc.**References:**

Willis 1973, A&amp;A, 26, 237. NRAO 300-ft at 2.7 GHz (5′:S=17±7).

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′:S=38).Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.

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

Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).Milne *et al.* 1989, PASAu, 8, 187. Parkes 64-m at 8.4 GHz (3′.0: S=12.9±1.0), including polarization.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (2′.9 × 3′.5: S=55).

Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (75″ × 55″: S=29.9±0.3).**G18.9 – 1.1****RA:** 18<sup>h</sup>27<sup>m</sup>00<sup>s</sup>**Dec:** –13°00′**1-GHz flux/Jy:** 37**Spectral index:** varies**Size/arcmin:** 33**Type:** C?

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

**Radio:** Non-thermal, diffuse partially limb-brightened, with central ridge.**X-ray:** Partial shell.**References:**Fürst *et al.* 1985, Natur, 314, 720. Effelsberg 100-m at 4.75 GHz (2′.4: S=23.8), plus other flux densities.

Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (7′.2 × 8′: S=82±15), plus review of flux densities.

Barnes &amp; Turtle 1988, in SNRISM, p347. Molonglo at 408 MHz (2′.9 × 3′.1: S=58±9) and Parkes 64-m at 5 GHz (4′.4 × 4′.1: S=23±6).

Patnaik *et al.* 1988, Natur, 332, 136. OSRT at 327 MHz (0′.6 × 1′.6).Fürst *et al.* 1989, A&A, 209, 361. Effelsberg 100-m at 4.75 GHz (2′.45: S=23.8) and VLA at 1.5 and 4.9 GHz (19″ × 14″), and Effelsberg 100-m at 1.4 GHz (9′) for HI.Aschenbach *et al.* 1991, A&A, 246, L32. ROSAT observations.Fürst *et al.* 1997, A&A, 319, 655. ROSAT observations, and Effelsberg 100-m at 10.6 GHz (1′.1).



**G20.0 – 0.2**

**RA:** 18<sup>h</sup>25<sup>m</sup>20<sup>s</sup>  
**Dec:** –11°37′

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

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

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

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

**References:**

Becker & Helfand 1985, ApJ, 297, L25. VLA at 1.4 and 5 GHz (12").  
 Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz (7'.2 × 8'.5: S=8.5±2), plus review of flux densities.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**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, A&A, 53, 89. WSRT at 5 GHz (6" × 35").  
 Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20" × 5") and 8 GHz (7" × 2"), plus review of flux densities.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
 Becker & Szymkowiak 1981, ApJ, 248, L23. VLA at 5 GHz (8"), and HRI and IPC observations.  
 Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT X-ray spectrum, and VLA HI observations.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (26".5: S=5.64±0.29).  
 Fürst *et al.* 1988, PASJ, 40, 347. NRO array at 22.3 GHz (4".4 × 7".3).  
 Salter *et al.* 1989, A&A, 225, 167. Observations at 90.7 (29".5: S=3.8±0.4) and 141.9 GHz (S=2.5±1.2).  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz (S=3.94±0.70), plus review of flux densities.  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.3 × 3'.4: S=9).  
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G21.8 – 0.6**

**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

Kes 69

**Radio:** Incomplete shell.

**X-ray:** Detected.

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Wilson 1972, A&A, 19, 354. 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, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5': S=42.3±4.6).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.3 × 3'.5: S=132).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including masers.

**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, AuJPA, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2'.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3'.3 × 3'.4: S=82).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G23.3–0.3**

W41

**RA:** 18<sup>h</sup>32<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 70**Size/arcmin:** 27**Dec:** –08°50′**Spectral index:** 0.5**Type:** S**Radio:** Incomplete ring, in complex region, overlapping G22.7–0.2.**Point sources:** Pulsar association suggested.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.3 × 3′.4:  $S=138$ ).  
 Gaensler & Johnston 1995, MNRAS, 275, L73. Possible pulsar association.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G23.6+0.3****RA:** 18<sup>h</sup>30<sup>m</sup>20<sup>s</sup>**1-GHz flux/Jy:** 8?**Size/arcmin:** 10?**Dec:** –08°15′**Spectral index:** 0.3**Type:** ?**Radio:** Not well resolved, in complex region.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G24.7–0.6****RA:** 18<sup>h</sup>36<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 8**Size/arcmin:** 15?**Dec:** –07°35′**Spectral index:** 0.5**Type:** S?**Radio:** Incomplete shell, defined in SW.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:  $S=12.3$ ) and Parkes 64-m at 5 GHz (4′:  $S=3.6$ ).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8:  $S=2.2 \pm 0.5$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (44′ × 56′′:  $S=1.9$ ).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G24.7+0.6****RA:** 18<sup>h</sup>31<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 20?**Size/arcmin:** 30 × 15**Dec:** –07°07′**Spectral index:** 0.2?**Type:** C?**Radio:** Filled-centre, with faint shell, and a compact HII region to the S.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Reich *et al.* 1984, A&A, 133, L4. Effelsberg 100-m at 2.7 GHz (4.3:  $S=19 \pm 3$ ) and 4.75 GHz (2′.4:  $S=17 \pm 4$ ) and NRO 45-m at 10.2 GHz (2′.7:  $S=15 \pm 3$ ).  
 Becker & Helfand 1987, ApJ, 316, 660. VLA at 1.4 GHz (12′′), and X-ray upper limit.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G27.4+0.0**

4C–04.71

**RA:** 18<sup>h</sup>38<sup>m</sup>40<sup>s</sup>**1-GHz flux/Jy:** 6**Size/arcmin:** 4**Dec:** –04°59′**Spectral index:** 0.68**Type:** S

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

**Radio:** Incomplete shell.

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

**Point sources:** Central long period pulsar.

**Distance:** HI absorption indicates 6 to 7.5 kpc.

**References:**

- Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8:  $S=2.0\pm 0.5$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3′:  $S=4.4$ ).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz (60′′ × 45′′:  $S=3.5$ ). Revise  $S(408)=10.4$ , and  $S(5000)=1.9\pm 0.2$ .  
 Kriss *et al.* 1985, ApJ, 288, 703. IPC and HRI observations, plus VLA at 1.4 and 5 GHz (12′′).  
 Sanbonmatsu & Helfand 1992, AJ, 104, 2189. VLA at 1.4 GHz for HI absorption.  
 Helfand *et al.* 1994, ApJ, 434, 627. ROSAT observations, particularly of central source.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations, including nearby masers.  
 Vasisht & Gotthelf 1997, ApJ, 486, L129. ASCA detection of pulsar.  
 Gotthelf & Vasisht 1997, ApJ, 486, L133. ASCA observations.

**G27.8+0.6****RA:** 18<sup>h</sup>37<sup>m</sup>06<sup>s</sup>**1-GHz flux/Jy:** 30**Size/arcmin:** 50 × 30**Dec:** –04°28′**Spectral index:** varies**Type:** F

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

**References:**

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

**G28.8+1.5****RA:** 18<sup>h</sup>36<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** ?**Size/arcmin:** 100?**Dec:** –02°40′**Spectral index:** 0.4?**Type:** S?

**Radio:** Part of rim detected.

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

**References:**

- Schwentker 1994, A&A, 286, L47. ROSAT observations.

**G29.7 – 0.3**

Kes 75

**RA:** 18<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:** Thermal shell and non-thermal core.**Distance:** HI absorption indicates > 9 kpc and possibly at 21 kpc.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8′.4:  $S=5 \pm 20\%$ ).  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).  
 Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20″ × 7″) and 8 GHz (25″ × 8″), plus review of flux densities.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Becker *et al.* 1983, ApJ, 268, L93. VLA at 1.4 GHz (3″), plus IPC and HRI.  
 Becker & Helfand 1984, ApJ, 283, 154. VLA at 5 GHz (2″.6), plus HI.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (26″.5:  $S=1.02 \pm 0.07$ ).  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.4 × 3′.7:  $S=27.4$ ).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Blanton & Helfand 1996, ApJ, 470, 961. ASCA observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G30.7+1.0****RA:** 18<sup>h</sup>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, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz (2′.4:  $S=3.4 \pm 0.4$ ), plus other flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.6 × 3′.9:  $S=8.6$ ).  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.

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

<b>G31.9+0.0</b>			3C391
<b>RA:</b> 18 <sup>h</sup> 46 <sup>m</sup> 50 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 24	<b>Size/arcmin:</b> 5 × 7	
<b>Dec:</b> −00°59′	<b>Spectral index:</b> 0.55	<b>Type:</b> S	
<b>Radio:</b> Shell, brightest in NW.			
<b>X-ray:</b> Diffuse with central core.			
<b>Distance:</b> HI absorption is seen to the tangent point (8.5 kpc).			
<b>References:</b>			
Radhakrishnan <i>et al.</i> 1972, ApJS, 24, 49. HI absorption.			
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).			
Green <i>et al.</i> 1975, A&A, 44, 187. Effelsberg 100-m at 15 GHz (58″ : $S > 1.6$ ).			
Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz (20″ × 23″) and 8 GHz (24″ × 9″), plus review of flux densities.			
Altenhoff <i>et al.</i> 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).			
Goss <i>et al.</i> 1979, A&A, 78, 75. FIRST at 1.4 GHz (54″ × 66″ : $S = 20 \pm 2$ ) and Effelsberg 100-m at 10.7 GHz (77″ : $S = 7.5 \pm 0.8$ ).			
Wang & Seward 1984, ApJ, 279, 705. IPC and HRI observations.			
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.4 × 3′.7 : $S = 44.8$ ).			
Reynolds & Moffett 1993, AJ, 105, 2226. VLA at 1.4 GHz (6″), including possible associated CO.			
Moffett & Reynolds 1994, ApJ, 425, 668. VLA at 330 MHz (smoothed to 30″ : $S = 38.5 \pm 0.5$ ) 1.46 GHz (6″.7) and 4.85 GHz (6″.2 × 6″.4), including spectral index and polarization studies.			
Frail <i>et al.</i> 1996, AJ, 111, 1651. OH emission near remnant, including masers.			
Gorham <i>et al.</i> 1996, ApJ, 458, 257. Pulsar search.			
Reach & Rho 1996, A&A, 315, L277. ISO spectroscopy.			
Rho & Petre 1996, ApJ, 467, 698. ROSAT observations.			
Wilner <i>et al.</i> 1998, AJ, 115, 247. CO observations of surroundings.			
<b>G32.0 – 4.9</b>			3C396.1
<b>RA:</b> 19 <sup>h</sup> 03 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 22?	<b>Size/arcmin:</b> 60?	
<b>Dec:</b> −03°00′	<b>Spectral index:</b> 0.5?	<b>Type:</b> S?	
<b>Radio:</b> Possible large shell?			
<b>References:</b>			
Milne & Hill 1969, AuJPh, 22, 211. Parkes 64-m at 635 MHz (31′ : $S = 25 \pm 30\%$ ), 1410 MHz (15′ : $S = 19 \pm 15\%$ ) and 2650 MHz (8′.4 : $S = 8.6 \pm 30\%$ ). Fluxes if size is 60′, plus review of flux densities.			
Caswell 1970, AuJPh, 23, 105. Revision of low frequency flux densities.			
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 111 MHz ( $S = 105 \pm 30$ ).			
<b>G32.1 – 0.9</b>			
<b>RA:</b> 18 <sup>h</sup> 50 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux/Jy:</b> ?	<b>Size/arcmin:</b> 40?	
<b>Dec:</b> −01°12′	<b>Spectral index:</b> ?	<b>Type:</b> C?	
<b>Radio:</b> Possible faint shell, not well defined.			
<b>X-ray:</b> Diffuse, with clumps.			
<b>References:</b>			
Folgheraiter <i>et al.</i> 1997, MNRAS, 292, 365. ROSAT and ASCA observations.			
<b>G32.8 – 0.1</b>			Kes 78
<b>RA:</b> 18 <sup>h</sup> 48 <sup>m</sup> 50 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 11?	<b>Size/arcmin:</b> 17	
<b>Dec:</b> −00°12′	<b>Spectral index:</b> 0.2?	<b>Type:</b> S?	
Part has been called G33.1–0.1.			
<b>Radio:</b> Elongated shell?			
<b>References:</b>			
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft et 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 <i>et al.</i> 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 12.8$ ) and Parkes 64-m at 5 GHz (4′ : $S = 7.7$ ).			
Altenhoff <i>et al.</i> 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).			
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.6 × 3′.8 : $S = 31.3$ ).			
Green <i>et al.</i> 1997, AJ, 114, 2058. Parkes 64-m OH observations.			

**G33.2–0.6****RA:** 18<sup>h</sup>51<sup>m</sup>12<sup>s</sup>**Dec:** –00°05′**1-GHz flux/Jy:** 3.5  
**Spectral index:** varies**Size/arcmin:** 18  
**Type:** S**Radio:** Incomplete shell.**References:**

Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Reich 1982, A&A, 106, 314. Effelsberg 100-m at 2.7 GHz (4′.4 :  $S=2.6\pm 0.3$ ) and 4.75 GHz (2′.5 :  $S=1.75\pm 0.2$ ).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (68″ × 52″ :  $S=2.7\pm 0.3$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S=35.5$ ) and Parkes 64-m at 5 GHz (4′ :  $S=7.8$ ).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430)=69\pm 33$ .  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′ :  $S=6.8\pm 1.5$ ).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz (6′.8 :  $S=11.4\pm 1.1$ ).  
 Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (1′), plus observations of the nearby point source.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source, possibly extragalactic.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source, plus IPC observations.  
 Green 1989, MNRAS, 238, 737. OH absorption.  
 Frail & Clifton 1989, ApJ, 336, 854. VLA at 1.4 GHz (1′ × 2′.9), including HI absorption.  
 Velusamy *et al.* 1991, AJ, 102, 676. VLA at 327 MHz (1′), 1.5 (7″ × 14″) and 5 GHz (7″), including spectral comparison.  
 Green & Dewdney 1992, MNRAS, 254, 686. Observations of adjacent molecular material.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.6 × 3′.8 :  $S=34.8$ ).  
 Seward & Velusamy 1995, ApJ, 439, 715. ROSAT observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G34.7 – 0.4**

W44, 3C392

**RA:** 18<sup>h</sup>53<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 230**Size/arcmin:** 35 × 27**Dec:** +01°18′**Spectral index:** 0.30**Type:** S

Has been called G34.6–0.5.

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

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

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

**Distance:** HI absorption indicates 3 kpc.

**References:**

- Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10.7 GHz ( $3' : S = 105 \pm 7$ ).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 177 \pm 10$ ).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ( $3' : S = 299$  which is less than the 390 Jy found by Kesteven 1968, AuJPh, 21, 739 with the same telescope).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 540 \pm 187$ .  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ( $8'.4$ ) and 5 GHz ( $4'.4$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
 Smith *et al.* 1985, MNRAS, 217, 99. IPC observations.  
 Wolszczan *et al.* 1991, ApJ, 372, L99. Pulsar detection.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3'.6 \times 3'.8 : S = 469$ ).  
 Jones *et al.* 1993, MNRAS, 265, 631. VLA at 1.4 GHz ( $15''$ ), plus X-ray spectra.  
 Rho *et al.* 1994, ApJ, 430, 757. Optical and ROSAT observations.  
 Koo & Heiles 1995, ApJ, 442, 679. HI of surrounding shell.  
 Esposito *et al.* 1996, ApJ, 461, 820. Possible associated  $\gamma$ -ray emission.  
 Harrus *et al.* 1996, ApJ, 464, L161. ASCA observations.  
 Frail *et al.* 1996, ApJ, 464, L165. VLA at 1.5 and 8.4 GHz ( $8''.9 \times 7''.8$ ) of pulsar nebula.  
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Reach & Rho 1996, A&A, 315, L277. ISO spectroscopy.  
 Harrus *et al.* 1997, ApJ, 488, 781. X-ray observations.  
 Causen *et al.* 1997, ApJ, 489, 143. VLA of associated OH masers.  
 Giacani *et al.* 1997, AJ, 113, 1379. VLA at 1.4 GHz ( $15''$ ), plus optical images.

**G36.6 – 0.7****RA:** 18<sup>h</sup>58<sup>m</sup>05<sup>s</sup>**1-GHz flux/Jy:** ?**Size/arcmin:** 25?**Dec:** +02°52′**Spectral index:** ?**Type:** S?

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

**References:**

- Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz ( $2'.4$ ), plus other flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3'.4 \times 3'.7 : S = 6.7$ ).  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.

**G36.6 + 2.6****RA:** 18<sup>h</sup>46<sup>m</sup>20<sup>s</sup>**1-GHz flux/Jy:** 0.7?**Size/arcmin:** 17 × 13?**Dec:** +04°23′**Spectral index:** 0.5?**Type:** S

**Radio:** Poorly resolved shell.

**References:**

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

**G39.2 – 0.3**

3C396, HC24, NRAO 593

**RA:** 19<sup>h</sup>01<sup>m</sup>40<sup>s</sup>**1-GHz flux/Jy:** 18**Size/arcmin:** 8 × 6**Dec:** +05°23′**Spectral index:** 0.6**Type:** S**Radio:** Shell, brightest to the W, with faint ‘tail’ to E.**X-ray:** Centrally brightened.**Distance:** HI absorption suggests at least 7.7 kpc.**References:**

- Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′).  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 54 \pm 38$ .  
 Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′ :  $S = 4.1 \pm 1.0$ ).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Cassim 1992, AJ, 103, 943. VLA at 1.4 GHz (65″ × 48″).  
 Becker & Helfand 1987, AJ, 94, 1629. VLA at 1.4 GHz (12″ :  $S = 14$ ) and 5 GHz, plus IPC observations.  
 Patnaik *et al.* 1990, A&A, 232, 467. VLA at 1.5 GHz (25″) and 1.4 GHz (7″.8 × 7″.5) and 5 GHz (25″) including polarization, plus OSRT at 327 MHz (100″ × 31″), including review of flux densities.  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.5 × 3′.6 :  $S = 42.5$ ).  
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz for spectral index studies.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G39.7 – 2.0**

W50, SS433

**RA:** 19<sup>h</sup>10<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 85?**Size/arcmin:** 120 × 60**Dec:** +04°50′**Spectral index:** 0.7?**Type:** ?

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

**Radio:** Elongated shell, containing SS433, adjacent to the HII region S74.**Optical:** Faint filaments at the edge of the radio emission.**X-ray:** Emission from SS433 and two lobes.**Point sources:** SS433 is the compact source in the centre of the W50.**Distance:** Distance to SS433 is 5 kpc.**References:**

- van den Bergh 1980, ApJ, 236, L23. Optical in H $\alpha$  and [SII].  
 Zealey *et al.* 1980, MNRAS, 192, 731. Optical spectra.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source (not SS433).  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Watson *et al.* 1983, ApJ, 273, 688. X-ray observations.  
 Downes *et al.* 1986, MNRAS, 218, 393. Effelsberg 100-m at 4.75 GHz (2′.4 :  $S = 34 \pm 4$ ), plus previous 1.7 and 2.7 GHz data.  
 Romney *et al.* 1987, ApJ, 321, 822. VLBI of SS433, including distance.  
 Elston & Baum 1987, AJ, 94, 1633. Mosaic with VLA at 1.4 GHz (30″) of fine structure only.  
 Kawai *et al.* 1989, PASJ, 41, 491. X-ray observations of SS433.  
 Band 1989, ApJ, 336, 937. Einstein and EXOSAT observations.  
 Yamauchi *et al.* 1994, PASJ, 46, L109. X-ray spectral observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Brinkmann *et al.* 1996, A&A, 312, 306. ROSAT observations.  
 Safi-Harb & Ögelman 1997, ApJ, 483, 868. ROSAT observations.

**G40.5 – 0.5****RA:** 19<sup>h</sup>04<sup>m</sup>45<sup>s</sup>**1-GHz flux/Jy:** 11**Size/arcmin:** 22**Dec:** +06°26′**Spectral index:** 0.5**Type:** S**Radio:** Shell, brightest to the NE.**References:**

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



**G41.1 – 0.3**

3C397

**RA:** 19<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, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $S′ : S = 21.3 \pm 1.2$  for both components).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 82 \pm 51$ , also Algonquin 46-m at 10.6 GHz ( $S′ : S = 12 \pm 2$ ), and Haystack 36-m at 15.5 GHz ( $2′.3 : S = 8.5 \pm 3.0$ ).  
 Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $S′ : S = 29.8$ ) and Parkes 64-m at 5 GHz ( $4′ : S = 8.7$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1.4 GHz ( $58″ \times 52″$ ).  
 Becker *et al.* 1985, ApJ, 296, 461. VLA at 1.4 and 5 GHz (8″), plus HRI and IPC observations.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to 30″ :  $S = 1.10 \pm 0.19$ ).  
 Kassim 1992, AJ, 103, 943. VLA at 327 MHz ( $3′.5 \times 3′.6 : S = 46.3$ ).  
 Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz, for spectral index studies.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G42.8 + 0.6****RA:** 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.**Point sources:** Near soft gamma repeater.**References:**

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

**G43.3 – 0.2**

W49B

**RA:** 19<sup>h</sup>08<sup>m</sup>44<sup>s</sup>  
**Dec:** +09°01′**1-GHz flux/Jy:** 38  
**Spectral index:** 0.48**Size/arcmin:** 4 × 3  
**Type:** S**Radio:** Shell, brightest to the SE and W, near the HII region W49A.**X-ray:** Filled-centre.**Distance:** HI absorption indicates 10 kpc.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 2.7 GHz (4′).  
 Downes & Wilson 1974, A&A, 34, 133. Effelsberg 100-m at 10.7 GHz (1′.3).  
 Caswell *et al.* 1975, A&A, 45, 239. HI absorption.  
 Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58″ : S = 9.0 \pm 0.7$ ).  
 Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).  
 Pye *et al.* 1984, MNRAS, 207, 649. HRI and IPC observations, and VLA at 1.4 and 5 GHz (both 12″).  
 Smith *et al.* 1985, ApJ, 296, 469. EXOSAT spectrum.  
 Morsi & Reich 1987, A&AS, 71, 189. Effelsberg 100-m at 32 GHz (smoothed to 30″ :  $S = 6.90 \pm 0.38$ ).  
 Moffett & Reynolds 1994, ApJ, 437, 705. VLA at 330 MHz ( $6″.7 \times 7″.7 : S = 64.4$ ), 1.48 GHz ( $4″.8 \times 5″.2 : S = 31.8$ ) and 4.85 GHz ( $4″.0 \times 4″.1$ ), including polarization.  
 Fujimoto *et al.* 1995, PASJ, 47, L31. ASCA observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G43.9+1.6****RA:** 19<sup>h</sup>03<sup>m</sup>30<sup>s</sup>**Dec:** +10°25′**1-GHz flux/Jy:** 8.6?**Spectral index:** 0.2?**Size/arcmin:** 60?**Type:** S?**Radio:** Large, poorly defined faint shell.**Point sources:** Soft gamma repeater nearby.**References:**Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz (4′.3).Vasisht *et al.* 1994, ApJ, 431, L35. VLA at 327 MHz (3′.2 × 3′.4).Hurley *et al.* 1996, ApJ, 463, L13. Observations of soft gamma repeater field.**G45.7–0.4****RA:** 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, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz (2′.4:  $S=2.6\pm 0.3$ ), plus other flux densities.Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.**G46.8–0.3****RA:** 19<sup>h</sup>15<sup>m</sup>50<sup>s</sup>**Dec:** +12°04′**1-GHz flux/Jy:** 14**Spectral index:** 0.5**Size/arcmin:** 17 × 13**Type:** S

(HC30)

Has been called G46.6–0.2.

**Radio:** Shell, two bright arcs to NNW and SSE.**Distance:** HI absorption suggests 6.8–8.8 kpc.**References:**Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S′: S=9.8\pm 0.9$ ), and VRO 37-m at 1.7 GHz ( $S=14.5\pm 5.5$ ).Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $S′: S=20.3$ ) and Parkes 64-m at 5 GHz ( $S′: S=7.1$ ).Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430)=46\pm 21$ .Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $S′: S=5.9\pm 0.6$ ).Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz ( $58'' \times 53'' : S=13.3\pm 0.1$ ).**G49.2–0.7****RA:** 19<sup>h</sup>21<sup>m</sup>30<sup>s</sup>**Dec:** +14°00′**1-GHz flux/Jy:** 160?**Spectral index:** 0.3?**Size/arcmin:** 30**Type:** S?

(W51)

**Radio:** In complex region, parameters uncertain.**X-ray:** Elongated east–west.**Distance:** HI absorption suggests 4.1 kpc.**References:**

Shaver &amp; Goss 1970, AuJPA, 14, 133. Parkes 64-m at 5 GHz (4′).

Sato 1973, PASJ, 25, 135. HI absorption.

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $S′$ ),  $S=51.5\pm 3.2$ , for the non-thermal component, but probably confused.Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).

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

Copetti &amp; Schmidt 1991, MNRAS, 250, 127. CLFST at 151 MHz.

Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.1 × 3′.5).

Subrahmanyan &amp; Goss 1995, MNRAS, 275, 755. VLA at 330 MHz (1′.1).

Koo *et al.* 1995, ApJ, 447, 211. ROSAT observations.Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.Green *et al.* 1997, AJ, 114, 2058. OH masers.

Koo &amp; Moon 1997, ApJ, 475, 194. Arecibo (3′) and VLA (40′′ × 42′′) at 1.4 GHz for HI.

Koo & Moon 1997, ApJ, 485, 263. NRAO 12-m CO and HCO<sup>+</sup> observations.

**G53.6 – 2.2**

**RA:** 19<sup>h</sup>36<sup>m</sup>30<sup>s</sup>  
**Dec:** +17°08′

**1-GHz flux/Jy:** 8  
**Spectral index:** 0.75

3C400.2, NRAO 611  
**Size/arcmin:** 28 × 33  
**Type:** S

Has been called G53.7–2.2.

**Radio:** Ring of emission, with extension to NW.

**Optical:** Filaments and diffuse emission.

**X-ray:** Centrally brightened, offset to NW.

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

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S' : S = 5.3 \pm 0.6$ ).  
van den Bergh 1978, ApJS, 38, 119. Optical.  
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $S' : S = 4.8 \pm 0.3$ ).  
Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ( $3' : S = 11.7$ ).  
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 20 \pm 10$ ,  $S(318) = 20 \pm 3.6$ .  
Goss *et al.* 1975, A&A, 43, 459. WSRT at 610 MHz ( $1' \times 3' : S = 13.2 \pm 1.6$ ).  
Sabbadin & d'Odorico 1976, A&A, 49, 119. Optical spectra.  
Rosado 1983, RMxAA, 8, 59. Optical spectra.  
Blair & Long 1988, PASP, 100, 461. Optical imaging and spectroscopy.  
Long *et al.* 1991, ApJ, 373, 567. IPC and optical observations.  
Winkler *et al.* 1993, ApJ, 405, 608. Optical imaging.  
Dubner *et al.* 1994, AJ, 108, 207. VLA at 327 MHz (59'') and 1.49 GHz (52''), plus X-rays.  
Saken *et al.* 1995, ApJ, 443, 231. ROSAT observations.  
Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.

**G54.1 + 0.3**

**RA:** 19<sup>h</sup>28<sup>m</sup>18<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, MNRAS, 216, 691. 5km at 2.7 GHz ( $7'' \times 20''$ ).  
Reich *et al.* 1985, A&A, 151, L10. Effelsberg 100-m at 4.75 GHz ( $2'.4 : S = 0.37 \pm 0.04$ )  
Velusamy & Becker 1988, AJ, 95, 1162. VLA at 1.4 ( $14'' : S = 0.48 \pm 0.03$ ), 1.6 ( $14'' : S = 0.42 \pm 0.03$ ) and 5 GHz ( $5'' : S = 0.33 \pm 0.02$ ), OSRT  
at 327 MHz ( $S = 0.50 \pm 0.08$ ), plus review of flux densities.  
Seward 1989, AJ, 97, 481. IPC observations  
Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G54.4 – 0.3**

**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

(HC40)  
**Size/arcmin:** 40  
**Type:** S

Has been called G54.5–0.3.

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

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $S' : S = 34.4 \pm 5.0$ ).  
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
Caswell 1985, AJ, 90, 1224. DRAO at 1.4 GHz ( $1'.3 \times 2'.6 : S = 18 \pm 4$ ).  
Velusamy *et al.* 1986, JApA, 7, 105. WSRT at 609 MHz ( $50'' \times 191''$  smoothed to  $100'' \times 200''$ ).  
Junkes *et al.* 1992, A&AS, 96, 1. Surrounding CO.  
Junkes *et al.* 1992, A&A, 261, 289. Nearby IRAS sources.

**G55.0+0.3**

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

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

**Size/arcmin:** 15 × 20?  
**Type:** S

Has been called G55.2+0.5.

**Radio:** Faint, partial shell.

**Distance:** Association with HI features implies 14 kpc.

**Point sources:** Old pulsar nearby.

**References:**

Matthews *et al.* 1998, ApJ, 493, 312. WSRT at 327 MHz ( $1'.0 \times 2'.9$ :  $S=0.98 \pm 0.15$ ), DRAO at 1.4 GHz ( $1'.0 \times 2'.9$ :  $S=0.25 \pm 0.12$ ), plus HI observations.

**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, A&A, 61, 93. WSRT observations at 610 MHz ( $57'' \times 156''$ :  $S=1.9 \pm 0.2$ ) and 1415 MHz ( $27'' \times 72''$ :  $S=1.0 \pm 0.1$ ).

**G57.2+0.8**

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

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

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

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

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

**References:**

Sieber & Seiradakis 1984, A&A, 130, 257. Effelsberg 100-m at 1.4 GHz ( $8'.8$ :  $1.34 \pm 0.1$ ), 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 ( $1' \times 3'$ ).

**G59.5+0.1**

**RA:** 19<sup>h</sup>40<sup>m</sup>25<sup>s</sup>  
**Dec:** +23°28′

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

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

Has been called G59.6+0.1.

**Radio:** Incomplete shell.

**References:**

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

**G59.8+1.2**

**RA:** 19<sup>h</sup>36<sup>m</sup>50<sup>s</sup>  
**Dec:** +24°12′

**1-GHz flux/Jy:** 1.6  
**Spectral index:** 0.5

**Size/arcmin:** 20 × 16?  
**Type:** ?

Has been called G59.7+1.2.

**Radio:** Poorly defined source.

**References:**

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

**G63.7+1.1****RA:** 19<sup>h</sup>45<sup>m</sup>50<sup>s</sup>**Dec:** +27°37′**1-GHz flux/Jy:** 1.8**Spectral index:** 0.3**Size/arcmin:** 8**Type:** F**Radio:** Centrally brightened, with core.**References:**Wallace *et al.* 1997, AJ, 114, 2068. WSRT at 1.4 GHz (14″ × 26″ :  $S=1.63$ ), DRAO at 1.4 GHz (smoothed to 2′), plus review of flux densities and other observations.**G65.1+0.6****RA:** 19<sup>h</sup>52<sup>m</sup>30<sup>s</sup>**Dec:** +28°25′**1-GHz flux/Jy:** 6**Spectral index:** 0.6**Size/arcmin:** 90 × 50**Type:** S**Radio:** Large, faint shell.**Point sources:** Pulsar nearby.**References:**Landecker *et al.* 1990, A&A, 232, 207. DRAO at 408 MHz (3′.5 × 7′.0 :  $S=9.5 \pm 0.1$ ), and 1.4 GHz (1′.0 × 2′.0 :  $S=5.4 \pm 1.0$ ). Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.**G65.3+5.7****RA:** 19<sup>h</sup>31<sup>m</sup>00<sup>s</sup>**Dec:** +31°05′**1-GHz flux/Jy:** 52?**Spectral index:** 0.6?**Size/arcmin:** 310 × 240**Type:** S?

Has been called G65.2+5.7.

**Radio:** Large, faint ring? near S91 and S94.**Optical:** 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, A&A, 72, 270. Effelsberg 100-m observations at 1.42 GHz (smoothed to 11′ :  $S=42.4 \pm 1.6$ ), estimate  $S(408)=91 \pm 5$  from previous sky survey.

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

Rosado 1981, ApJ, 250, 222. Optical interferometry.

Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.

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

Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.**G65.7+1.2****RA:** 19<sup>h</sup>50<sup>m</sup>10<sup>s</sup>**Dec:** +29°18′**1-GHz flux/Jy:** 5.1**Spectral index:** 0.6

DA 495

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

Has mistakenly been called G55.7+1.2.

**Radio:** Filled-centre or thick shell?**References:**Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $S′ : S=2.8 \pm 0.4$ ), and VRO 37-m at 1.7 GHz ( $S=4.4 \pm 0.5$ ), plus review of flux densities.Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430)=8.7 \pm 4.9$ ,  $S(318)=9.7 \pm 2.2$ .Landecker & Caswell 1983, AJ, 88, 1810. DRAO at 1.4 GHz (0′.9 × 1′.5 :  $S=4.4 \pm 0.2$ ).Velusamy *et al.* 1989, JApA, 10, 161. OSRT at 327 MHz (36″ × 64″), WSRT at 610 MHz (62″) and VLA at 1.4 GHz (36″ and 12″), including IRAS imaging.

Biggs &amp; Lyne 1996, MNRAS, 282, 691. Pulsar search.

Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G67.7+1.8**

**RA:** 19<sup>h</sup>52<sup>m</sup>34<sup>s</sup>  
**Dec:** +31°21′

**1-GHz flux/Jy:** 1.4  
**Spectral index:** 0.3

**Size/arcmin:** 9  
**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 ( $S=0.42 \pm 0.05$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G68.6–1.2**

**RA:** 20<sup>h</sup>06<sup>m</sup>40<sup>s</sup>  
**Dec:** +30°28′

**1-GHz flux/Jy:** 0.7?  
**Spectral index:** 0.0?

**Size/arcmin:** 28 × 25?  
**Type:** ?

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

**References:**

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G69.0+2.7**

**RA:** 19<sup>h</sup>51<sup>m</sup>30<sup>s</sup>  
**Dec:** +32°45′

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

**CTB 80**  
**Size/arcmin:** 80?  
**Type:** ?

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

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

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

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

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

**References:**

Angerhofer *et al.* 1981, A&A, 94, 313. WSRT at 610 MHz ( $56'' \times 103''$ ) 1.4 GHz ( $24'' \times 44''$ ) and 5 GHz ( $7'' \times 13''$ ), plus optical.  
 Becker *et al.* 1982, ApJ, 255, 557. X-ray observations.  
 Sofue *et al.* 1983, PASJ, 35, 437. NRO 45-m at 10.2 GHz ( $2'.7$ ).  
 Velusamy & Kundu 1983, JApA, 3, 253. VLA of compact sources.  
 Blair *et al.* 1984, ApJ, 282, 161. Optical images and spectra.  
 Wang & Seward 1984, ApJ, 285, 607. IPC observations.  
 Strom *et al.* 1984, A&A, 139, 43. Radio observations of flat spectrum component, VLA 5 GHz ( $1''.7$ ) and 1.4 GHz.  
 Mantovani *et al.* 1985, A&A, 145, 50. Bologna at 408 MHz ( $2'.6 \times 4'.9$ :  $S=67.5 \pm 10.5$ ), Effelsberg 100-m at 1.41 ( $9'$ :  $S=62 \pm 9$ ), 1.72 ( $7'.6$ :  $S=66 \pm 5$ ), 2.7 ( $4'.5$ :  $S=52 \pm 4$ ) and 4.75 GHz ( $2'.4$ :  $S=44 \pm 3.3$ ), plus review of flux densities.  
 Kulkarni *et al.* 1988, Natur, 331, 50. Pulsar detection.  
 Angelini *et al.* 1988, ApJ, 330, L43. EXOSAT spectra.  
 Fesen *et al.* 1988, Natur, 334, 229. IRAS of surrounding shell.  
 Whitehead *et al.* 1989, MNRAS, 237, 1109. Optical of core.  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of flux densities.  
 Hester & Kulkarni 1989, ApJ, 340, 362. Optical imaging and spectroscopy.  
 Koo *et al.* 1990, ApJ, 364, 178. Large, expanding HI shell.  
 Greidanus & Strom 1990, A&A, 240, 376. Optical kinematics of core.  
 Koo *et al.* 1993, ApJ, 417, 196. VLA at 1.4 GHz of surrounding HI ( $1'$ ), plus IRAS.  
 Safi-Harb *et al.* 1995, ApJ, 439, 722. ROSAT observations.  
 Srinivasan 1997, ApJ, 489, 170.  $\gamma$ -ray observations of pulsar.

**G69.7+1.0**

**RA:** 20<sup>h</sup>00<sup>m</sup>45<sup>s</sup>  
**Dec:** +32°35′

**1-GHz flux/Jy:** 1.6  
**Spectral index:** 0.8

**Size/arcmin:** 16  
**Type:** S

**Radio:** Poorly resolved source.

**References:**

Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.  
 Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G73.9+0.9****RA:** 20<sup>h</sup>12<sup>m</sup>20<sup>s</sup>**Dec:** +36°03′**1-GHz flux/Jy:** 9?**Spectral index:** 0.3?**Size/arcmin:** 22?**Type:** S?**Radio:** Diffuse, centrally brightened to SW.**Optical:** Weak shell.**References:**

Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz ( $2'.4 : S = 6.7 \pm 0.5$ ), plus other flux densities.  
 Chastenay & Pineault 1988, in SNRISM, p297. DRAO at 408 MHz ( $3'.5 \times 5'.9$ ) and 1.4 GHz ( $1'.0 \times 1'.7$ ).  
 Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz ( $3'.4 \times 5'.8 : S = 12.7 \pm 1.2$ ) and 1.4 GHz ( $1'.0 \times 1'.7 : S = 7.4 \pm 1.0$ ).  
 Lozinskaya *et al.* 1993, ARep, 37, 240. Optical observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Pineault *et al.* 1996, AJ, 112, 201. DRAO at 1.4 GHz (smoothed to 2') for HI.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G74.0–8.5****RA:** 20<sup>h</sup>49<sup>m</sup>00<sup>s</sup>**Dec:** +30°30′**1-GHz flux/Jy:** 210**Spectral index:** varies**Cygnus Loop****Size/arcmin:** 230 × 160**Type:** S**Radio:** Shell, brightest to the NE, with fainter breakout region to S, with spectral variations.**Optical:** Large filamentary loop, brightest to the NE, not well defined to the S or W.**X-ray:** Shell in soft X-rays.**Point sources:** Several compact radio sources within the boundary of the remnant, including CL4.**References:**

Keen *et al.* 1973, A&A, 28, 197. Effelsberg 100-m at 2.7 GHz ( $4'.8$ ), NE at 10.7 GHz ( $1'.25$ ).  
 Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz ( $56'' \times 107''$ ) of NE area (NGC6992) only.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of CL4.  
 Fesen *et al.* 1982, ApJ, 262, 171. Optical spectroscopy.  
 Hester *et al.* 1983, ApJ, 273, 219. Optical imagery.  
 Ku *et al.* 1984, ApJ, 278, 615. IPC and HRI X-ray observations.  
 Green 1984, MNRAS, 211, 433. Most of remnant at 408 MHz ( $80'' \times 160''$ ) with OMT.  
 Charles *et al.* 1985, ApJ, 295, 456. IPC observations.  
 Braun & Strom 1986, A&A, 164, 208. IRAS observations.  
 Straka *et al.* 1986, ApJ, 306, 266. Radio and optical comparison of NE. VLA at 1.6 GHz ( $4''.7$ ) plus optical.  
 Raymond *et al.* 1988, ApJ, 324, 869. Detailed optical study of filaments.  
 Ballet *et al.* 1989, A&A, 211, 217. [Fex] and [FexIV] spectroscopy.  
 Ballet & Rothenflug 1989, A&A, 218, 277. EXOSAT observations.  
 Green 1990, AJ, 100, 1927. DRAO at 408 MHz ( $3'.3 \times 6'.7$ ) for spectral index study, plus X-ray and optical.  
 Graham *et al.* 1991, AJ, 101, 175. Shocked molecular H outside rim in NE.  
 Shull & Clarke 1991, PASP, 103, 811. Optical spectroscopy of nearside filaments.  
 Blair *et al.* 1991, ApJ, 374, 202. Far UV mapping.  
 Blair *et al.* 1991, ApJ, 379, L33. UV spectroscopy.  
 Greidanus & Strom 1992, A&A, 257, 265. Optical kinematics.  
 Shull & Hippelein 1992, ApJ, 383, 714. Optical kinematics and proper motion.  
 Fesen *et al.* 1992, AJ, 104, 719. H $\alpha$  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.  
 Vancura *et al.* 1993, ApJ, 417, 663. Far UV observations.  
 Hester *et al.* 1994, ApJ, 420, 721. H $\alpha$ , [OIII] and other optical observations of Balmer dominated filaments in NE.  
 Miyata *et al.* 1994, PASJ, 46, L101. X-ray observations of NE.  
 Graham *et al.* 1995, ApJ, 444, 787. X-ray and optical studies of interaction with surroundings.  
 Sauvageot & Decourchelle 1995, A&A, 296, 201. [Fex] and [FexIV] observations.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Levenson *et al.* 1996, ApJ, 468, 323. ROSAT and optical observations of W.  
 Decourchelle *et al.* 1997, A&A, 326, 811. ROSAT observations of N.  
 Levenson *et al.* 1997, ApJ, 484, 304. ROSAT observations.  
 Leahy *et al.* 1997, AJ, 114, 2081. DRAO at 1.4 GHz ( $1' \times 2'$ ), including polarisation.  
 Miyata *et al.* 1998, PASJ, 50, 257. ASCA 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**Dec:** +37°03′**Spectral index:** varies**Type:** F**Radio:** Filled-centre, with high polarization and high frequency turnover.**X-ray:** Centrally brightened.**Distance:** HI absorption indicates 12 kpc.**Point sources:** Extragalactic compact source is nearby.**References:**

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo  $S(430) = 12.2 \pm 9.7$ ,  $S(318) = 17.7 \pm 5.0$ .  
 Weiler & Shaver 1978, A&A, 70, 389. WSRT at 610 MHz ( $57'' \times 94'' : S = 9.1 \pm 1.2$ ), 1.4 ( $24'' \times 40'' : S = 8.7 \pm 1.2$ ) and 5 GHz ( $24'' \times 40'' : S = 5.6 \pm 1.3$ ).  
 Geldzahler *et al.* 1980, A&A, 84, 237. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 7.6 \pm 0.5$ ).  
 Wilson 1980, ApJ, 241, L19. IPC observations.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption of nearby compact source.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (smoothed to  $40'' : S = 1.47 \pm 0.19$ ).  
 Green & Gull 1989, MNRAS, 237, 555. VLA at 1.4 GHz ( $1'.2 \times 1'.4$ ) including HI.  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz, plus review of flux densities.  
 Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz ( $3'.4 \times 5'.8 : S = 11.6 \pm 0.4$ ) and 1.4 GHz ( $1'.0 \times 1'.7 : S = 7.2 \pm 0.3$ ).  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz ( $3'.5 \times 5'.2 : S = 13.3 \pm 0.8$ ) and Effelsberg 100-m at 4.8 GHz ( $S = 7.5 \pm 0.7$ ).  
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.  
 Cho *et al.* 1994, AJ, 108, 634. CO of adjacent molecular clouds.  
 Gorham *et al.* 1996, ApJ, 458, 257. Pulsar search.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Wallace *et al.* 1997, A&A, 317, 212. DRAO at 408 MHz ( $3'.4 \times 5'.5$ ) and 1.4 GHz ( $1'.0 \times 1'.6$ ) including HI (smoothed to  $2'$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G76.9+1.0****RA:** 20<sup>h</sup>20<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 2**Size/arcmin:** 9 × 12**Dec:** +38°33′**Spectral index:** 0.6**Type:** ?**Radio:** Diffuse, non-thermal, with low frequency turnover.**References:**

Landecker *et al.* 1993, A&A, 276, 522. VLA at 1.49 GHz ( $14''$ ), 4.86 GHz ( $13'' \times 16''$ ) and 8.55 GHz ( $11'' \times 12''$ ), including polarization and review of flux densities.  
 Landecker *et al.* 1997, A&AS, 123, 199. Miyun at 232-MHz ( $3'.8 \times 5'.4$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G78.2+2.1**DR4,  $\gamma$  Cygni**RA:** 20<sup>h</sup>19<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 340**Size/arcmin:** 60**Dec:** +40°15′**Spectral index:** 0.5**Type:** S

Has been called G78.1+1.8.

**Radio:** In complex region (early catalogues refer to other proposed remnants in this region).**Optical:** Faint filaments, spectra indicate a SNR superposed on a HII region.**X-ray:** Weak emission from the SE of the remnant.**Point sources:**  $\gamma$ -ray and X-ray point source in 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, A&AS, 28, 439. Optical spectra.  
 van den Bergh 1978, ApJS, 38, 119. Optical.  
 Landecker *et al.* 1980, A&AS, 39, 133. DRAO HI observations ( $2' \times 3'.1$ ).  
 Higgs *et al.* 1983, AJ, 88, 97. CO of surroundings.  
 Bohigas *et al.* 1983, RMxAA, 8, 155. Optical spectra, find thermal only.  
 Braun & Strom 1986, A&AS, 63, 345. WSRT HI observations.  
 Fukui & Tatematsu 1988, in SNRISM, p261. CO observations of the vicinity ( $2'.7$ ).  
 Green 1989, MNRAS, 238, 737. OH observations.  
 Pineault & Chastenay 1990, MNRAS, 246, 169. DRAO at 408 MHz ( $3'.4 \times 5'.8 : S = 480 \pm 60$ ) and 1.4 GHz ( $1'.0 \times 1'.7 : S = 270 \pm 40$ ).  
 Wendker *et al.* 1991, A&A, 241, 551. DRAO at 408 MHz ( $3'.5 \times 5'.2 : S = 540 \pm 40$ ) and Effelsberg 100-m at 4.8 GHz ( $S = 150 \pm 15$ ).  
 Esposito *et al.* 1996, ApJ, 461, 820. Associated  $\gamma$ -ray emission.  
 Brazier *et al.* 1996, MNRAS, 281, 1033.  $\gamma$ -ray and X-ray point source.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Zhang *et al.* 1997, A&A, 324, 641. Multi-frequency radio comparison.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.



**G82.2+5.3**

W63

**RA:** 20<sup>h</sup>17<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 120?**Size/arcmin:** 95 × 65**Dec:** +45°20′**Spectral index:** 0.5?**Type:** S**Radio:** Shell in the Cygnus X complex.**Optical:** In complex region, but spectra indicate SNR filaments.**X-ray:** Detected.**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 59.0 \pm 3.5$ ).  
 Sabbadin 1976, A&A, 51, 159. Optical spectra.  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $6' .8$ ). Incomplete mapping.  
 Rosado & González 1981, RMxAA, 5, 93. Optical spectra.  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Higgs *et al.* 1991, JRASC, 85, 24. DRAO at 408 MHz ( $3' .4 \times 5' .0 : S = 165 \pm 21$ ), plus review of flux densities.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G84.2–0.8****RA:** 20<sup>h</sup>51<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 11**Size/arcmin:** 20 × 16**Dec:** +43°16′**Spectral index:** 0.5**Type:** S**Radio:** Elongated shell, with a filament aligned with the major axis.**References:**

Mathews *et al.* 1977, A&A, 55, 1. WSRT at 610 MHz ( $56'' \times 81'' : S = 12.4 \pm 1.5$ ) and Effelsberg 100-m at 2.7 GHz ( $4' .4 : S = 6.8 \pm 1.3$ ).  
 Mathews & Shaver 1980, A&A, 87, 255. WSRT at 1415 MHz ( $23'' \times 32''$ ), and Effelsberg 100-m at 2.7 GHz ( $4' .4 : S = 5.6 \pm 0.5$ ).  
 Feldt & Green 1993, A&A, 274, 421. DRAO at 1.4 GHz ( $1' \times 1' .5$ ), including HI, plus CO observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G84.9+0.5****RA:** 20<sup>h</sup>48<sup>m</sup>45<sup>s</sup>**1-GHz flux/Jy:** 0.8**Size/arcmin:** 6**Dec:** +44°42′**Spectral index:** 0.4**Type:** S**Radio:** Incomplete shell.**References:**

Taylor *et al.* 1992, AJ, 103, 931. WSRT at 327 MHz ( $1' .4 \times 1' .0 : S = 1.2 \pm 0.1$ ), and northern sky survey at 4.9 GHz ( $S = 0.40 \pm 0.01$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G89.0+4.7**

HB21

**RA:** 20<sup>h</sup>43<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 220**Size/arcmin:** 120 × 90**Dec:** +50°25′**Spectral index:** 0.40**Type:** S**Radio:** Distorted shell (4C50.52, an extragalactic double, is within the boundary of the remnant).**Optical:** Filaments possibly associated.**X-ray:** Centrally brightened.**References:**

Hirabayashi & Takahashi 1972, PASJ, 24, 231. 30-m dish at 4.2 GHz ( $11' : S = 160 \pm 40$ ).  
 Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $5' : S = 148 \pm 16$ ), plus optical filaments.  
 Hill 1974, MNRAS, 169, 59. HMT at 1.4 GHz ( $3' \times 3' .9$ ).  
 Haslam *et al.* 1975, A&A, 39, 453. Effelsberg 100-m at 2.7 GHz ( $4' .4$ ).  
 Fukui & Tatsumatsu 1988, in SNRISM, p261. CO observations of the vicinity ( $2' .7$ ).  
 Tatsumatsu *et al.* 1990, A&A, 237, 189. DRAO at 408 MHz ( $3' .5 \times 4' .5$ ) and 1.4 GHz ( $1' .0 \times 1' .3$ ), including HI, plus CO observations of adjacent molecular cloud.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Leahy & Aschenbach 1996, A&A, 315, 260. ROSAT observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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<b>G93.3+6.9</b>		DA 530, 4C(T)55.38.1
<b>RA:</b> 20 <sup>h</sup> 51 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 9	<b>Size/arcmin:</b> 27 × 20
<b>Dec:</b> +55°10′	<b>Spectral index:</b> 0.54	<b>Type:</b> S

Has been called G93.2+6.7.

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

**References:**

Roger & Costain 1976, A&A, 51, 151. DRAO at 1.42 GHz ( $2' \times 2'.4: S=6.9$ ).

Haslam *et al.* 1980, A&A, 92, 57. Effelsberg 100-m at 1.72 GHz ( $7'.6: S=6.47 \pm 0.52$ ) and 2.7 GHz ( $4'.4: S=5.64 \pm 0.64$ ), plus review of flux densities.

Lalitha *et al.* 1984, A&A, 131, 196. Effelsberg 100-m at 4.75 GHz (smoothed to  $3': S=4.01 \pm 0.57$ ).

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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<b>G93.7 – 0.2</b>		CTB 104A, DA 551
<b>RA:</b> 21 <sup>h</sup> 27 <sup>m</sup> 45 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 65	<b>Size/arcmin:</b> 80
<b>Dec:</b> +50°35′	<b>Spectral index:</b> 0.3	<b>Type:</b> S

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

**Radio:** Faint shell with possible a steep spectrum core.

**References:**

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5': S=18.4 \pm 1.0$ ).

Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz ( $7'.6: S=53.5 \pm 5.0$ ), plus review of flux densities.

Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to  $2': S=58 \pm 6$ ).

Mantovani *et al.* 1991, A&A, 247, 545. Effelsberg 100-m at 4.75 GHz (smoothed to  $3': S=33.5 \pm 4.0$ ), including polarization, plus review of flux densities.

Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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<b>G94.0+1.0</b>		3C434.1
<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, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $5': S=6.1 \pm 0.8$ ), and VRO 37-m at 1.7 GHz ( $S=11 \pm 3$ ).

Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5': S=5.8 \pm 0.4$ ). Also NRAO 140-ft at 5 GHz ( $6'$ ).

Mantovani *et al.* 1982, A&A, 105, 176. Effelsberg 100-m at 1.7 GHz ( $7'.6: S=12.0 \pm 1.3$ ), plus review of flux densities.

Goss *et al.* 1984, A&A, 138, 469. WSRT at 610 MHz (smoothed to  $100'': S=16 \pm 1.7$ ) and Effelsberg 100-m at 4.75 GHz ( $2'.4: S=7.2 \pm 0.5$ ).

Landecker *et al.* 1985, AJ, 90, 1082. DRAO at 1.4 GHz (smoothed to  $2': S=16 \pm 3$ ).

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G109.1 – 1.0**

CTB 109

**RA:** 22<sup>h</sup>59<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 20**Size/arcmin:** 28**Dec:** +58°37'**Spectral index:** 0.50**Type:** S**Radio:** Semicircular shell, with the Molecular cloud S152 is to the immediate W.**X-ray:** Incomplete shell.**Point sources:** Pulsar at W edge.**References:**Hughes *et al.* 1981, ApJ, 246, L127. WSRT at 610 MHz ( $1' : S = 40 \pm 5$ ) shows bad CLEAN artefacts.

Blair &amp; Kirshner 1981, Natur, 291, 132. Optical spectra.

Downes 1983, MNRAS, 203, 695. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 13.0 \pm 1.5$ ).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 &amp; Strom 1986, A&amp;AS, 63, 345. WSRT Hi observations.

Tatematsu *et al.* 1987, PASJ, 39, 755. NRO 45-m at 10 GHz ( $2'.7$ ), plus polarization.Tatematsu *et al.* 1987, A&A, 184, 279. CO observations of the surroundings ( $2'.7$ ).Hanson *et al.* 1988, A&A, 195, 114. EXOSAT of pulsar.Morini *et al.* 1988, ApJ, 333, 777. EXOSAT observations.Koyama *et al.* 1989, PASJ, 41, 461. X-ray observations of pulsar.Coe *et al.* 1989, MNRAS, 238, 649. IRAS observations of surroundings.

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

Tatematsu *et al.* 1990, ApJ, 351, 157. CO of surroundings, plus X-ray observations.

Davies &amp; Coe 1991, MNRAS, 249, 313. Optical and IR observations near pulsar.

Hurford &amp; Fesen 1995, MNRAS, 277, 549. ROSAT imaging.

Rho &amp; Petre 1997, ApJ, 484, 828. ROSAT observations.

Parmar *et al.* 1998, A&A, 330, 175. X-ray observations.Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G111.7 – 2.1****RA:** 23<sup>h</sup>21<sup>m</sup>10<sup>s</sup>**Dec:** +58°32′**1-GHz flux/Jy:** 2720**Spectral index:** 0.77

Cassiopeia A, 3C461

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

Presumably the remnant of a late 17th century SN.

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

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

**X-ray:** Incomplete shell, with hard spectral component.

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

**References:**

- Bell *et al.* 1975, *Natur*, 257, 463. 5km at 5 GHz ( $2'' \times 2''.3$ ).
- Green *et al.* 1975, *A&A*, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58'' : S=419.1 \pm 1.7$ ).
- Fabian *et al.* 1980, *MNRAS*, 193, 175. HRI observations.
- Tuffs 1986, *MNRAS*, 219, 13. Proper motions from 5km maps at 5 GHz ( $2'' \times 2''.3$ ) between 1974 and 1978.
- Mezger *et al.* 1986, *A&A*, 167, 145. 247-GHz map ( $70''$ ).
- Fesen *et al.* 1987, *ApJ*, 313, 378. Optical, of fast moving flocculi.
- Fesen *et al.* 1988, *ApJ*, 329, L89. Optical, flocculi, and ‘flare’.
- Woan & Duffett-Smith 1990, *MNRAS*, 243, 87. Structure at 81.5 MHz.
- Fesen 1990, *AJ*, 99, 1904. [Nem] optical imagery.
- Rees 1990, *MNRAS*, 243, 637. Flux density decrease at 38 MHz.
- Anderson *et al.* 1991, *ApJ*, 373, 146. VLA at 1.4 and 5 GHz ( $1''.3$ ) for spectral variations.
- Hook *et al.* 1992, *A&A*, 255, 285. Flux density decrease at 81.5 MHz.
- Wilson *et al.* 1993, *A&A*, 280, 221. Molecular emission towards remnant.
- Holt *et al.* 1994, *PASJ*, 46, L151. X-ray spectral mapping.
- Woan & Duffett-Smith 1993, *MNRAS*, 260, 693. Deep pulsar search.
- Guame *et al.* 1994, *ApJ*, 425, 127. NH<sub>3</sub> absorption and CO observations.
- Iyudin *et al.* 1994, *A&A*, 284, L1.  $\gamma$ -ray line observations.
- Reed *et al.* 1995, *ApJ*, 440, 706. Optical spectra, for 3-d structure.
- Anderson *et al.* 1995, *ApJ*, 441, 300. VLA at 1.4 GHz and 4.8 GHz (both  $1''.3$ ), for polarization studies.
- Anderson & Rudnick 1995, *ApJ*, 441, 307. VLA at 1.4 GHz and 4.8 GHz, for proper motion studies.
- The *et al.* 1995, *ApJ*, 444, 244.  $\gamma$ -ray observations.
- Predehl & Schmitt 1995, *A&A*, 293, 889. ROSAT of dust scattered halo.
- Liszt & Lucas 1995, *A&A*, 294, 811. NRAO 12-m observations of molecular emission and absorption.
- Lawrence *et al.* 1995, *AJ*, 109, 2635. Optical imaging spectroscopy.
- Kassim *et al.* 1995, *ApJ*, 455, L59. VLA at 74 ( $25''$ ) and 332 MHz ( $6''$ ), including spectral index comparisons.
- Anderson & Rudnick 1996, *ApJ*, 456, 234. VLA for spectral index comparisons.
- Agafanov 1996, *A&A*, 306, 578. Flux density decrease at 102 MHz.
- Biggs & Lyne 1996, *MNRAS*, 282, 691. Pulsar search.
- Vink *et al.* 1996, *A&A*, 307, L41. ASCA spectrum.
- Lagage *et al.* 1996, *A&A*, 315, L273. ISO observations.
- Keohane *et al.* 1996, *ApJ*, 466, 309. Radio and X-ray comparison.
- Hurford & Fesen 1996, *ApJ*, 469, 246. Optical spectroscopy and reddening studies.
- Fesen & Gunderson 1996, *ApJ*, 470, 967. Optical observations of NE ‘jet’.
- Allen *et al.* 1997, *ApJ*, 487, L97. X-ray spectroscopy.
- Schwarz *et al.* 1997, *A&AS*, 123, 43. WST at 1.4 GHz ( $30''$ ) for H<sub>i</sub> absorption.
- Reynoso *et al.* 1997, *A&A*, 317, 203. VLA at 1.4 GHz ( $11'' \times 14''$ ) for H<sub>i</sub> absorption.
- Favata *et al.* 1997, *A&A*, 324, L49. X-ray spectroscopy.
- Dupraz *et al.* 1997, *A&A*, 324, 683.  $\gamma$ -ray line detection.
- Lorimer *et al.* 1998, *A&A*, 331, 1002. Pulsar search.

**G112.0+1.2****RA:** 23<sup>h</sup>13<sup>m</sup>40<sup>s</sup>**Dec:** +61°30′**1-GHz flux/Jy:** 7?**Spectral index:** 0.6?**Size/arcmin:** 30?**Type:** S?

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

**References:**

- Bonsignori-Facondi & Tomasi 1979, *A&A*, 77, 93. Bologna at 408 MHz ( $4'.2 \times 110'$ :  $S=11 \pm 30\%$ ).
- Lorimer *et al.* 1998, *A&A*, 331, 1002. Pulsar search.

**G114.3+0.3****RA:** 23<sup>h</sup>34<sup>m</sup>45<sup>s</sup>**Dec:** +61°38′**1-GHz flux/Jy:** 6?**Spectral index:** 0.3?**Size/arcmin:** 90 × 55**Type:** S**Radio:** Shell, with HII region S165 within the boundary of the remnant.**Distance:** Possible association with HI features suggests 3.0–3.8 kpc.**Point sources:** Pulsar near centre of remnant.**References:**

Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 3.6$ ) and  $S(1.4) = 4.4$  from 1.4 GHz survey data, plus HI from Maryland-Green Bank survey.  
 Kulkarni *et al.* 1993, Natur, 362, 135. Pulsar association.  
 Fürst *et al.* 1993, A&A, 276, 470. Pulsar association.  
 Becker *et al.* 1996, A&A, 306, 464. ROSAT of pulsar.  
 Fesen *et al.* 1997, AJ, 113, 767. Optical observations.

**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, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 4.7 \pm 0.4$ ) and  $S(1.4) = 8.0 \pm 0.8$  from 1.4 GHz survey data, plus HI from Maryland-Green Bank survey.  
 Fesen *et al.* 1997, AJ, 113, 767. Optical observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G116.9+0.2****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

CTB 1

Has been called G117.3+0.1 and G116.9+0.1.

**Radio:** Incomplete shell.**Optical:** Filaments on sky survey.**X-ray:** Centrally brightened, with NE ‘breakout’.**Point sources:** Pulsar to NE.**Distance:** Possible association with HI features suggests 2.8–4.0 kpc, mean optical velocity suggests 2.7 kpc.**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $5' : S = 3.9 \pm 1.0$ ), and VRO 37-m at 1.7 GHz ( $S = 5.5 \pm 2.0$ ), plus review of flux densities.  
 van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 4.2 \pm 0.2$ ).  
 Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ( $6'.8 : S = 3.0 \pm 0.3$ ).  
 Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz ( $56'' \times 64''$ ) and 1.4 GHz ( $22'' \times 25''$ ).  
 Reich & Braunsfurth 1981, A&A, 99, 17. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 4.8 \pm 0.4$ ) and  $S(1.4) = 7.8 \pm 0.8$  from 1.4 GHz survey data, plus HI from Maryland-Green Bank survey.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Landecker *et al.* 1982, AJ, 87, 1379. DRAO at 1.42 GHz and HI ( $2' \times 2'.3 : S = 8.3 \pm 0.5$ ), plus review of flux densities.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Hailey & Craig 1994, ApJ, 434, 635. Optical spectroscopy.  
 Hailey & Craig 1995, ApJ, 455, L151. ROSAT of nearby pulsar.  
 Fesen *et al.* 1997, AJ, 113, 767. Optical observations.  
 Craig *et al.* 1997, ApJ, 488, 307. ROSAT observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**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, A&A, 77, 93. Bologna at 408 MHz ( $4'.2 \times 110' : S = 45 \pm 30\%$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G119.5+10.2**

CTA 1

**RA:** 00<sup>h</sup>04<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 36**Size/arcmin:** 90'**Dec:** +72°30'**Spectral index:** 0.6**Type:** S

Has been called G119.5+10.3.

**Radio:** Incomplete shell, with ‘breakout’ to NW.

**Optical:** Faint diffuse nebulosities.

**X-ray:** Centrally brightened.

**Point sources:** Compact, central X-/γ-ray source.

**References:**

- Sieber *et al.* 1979, A&A, 74, 361. Effelsberg 100-m at 2.7 GHz ( $4'.4 : S = 23.6 \pm 2.8$ ).  
 Sieber *et al.* 1981, A&A, 103, 393. Effelsberg 100-m at 2.7 GHz and 1.7 GHz ( $7'.6 : S = 31.6 \pm 2.5$ ), and 6C at 151 MHz ( $4' : S = 62.6 \pm 6$ ).  
 Fesen *et al.* 1981, ApJ, 247, 148. Optical, including spectra.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Simonetti 1992, ApJ, 386, 170. VLA observations of background sources for rotation measure studies.  
 Pineault *et al.* 1993, AJ, 105, 1060. DRAO at 1.4 GHz ( $1' : S = 34 \pm 4$ ), plus HI and IRAS.  
 Seward *et al.* 1995, ApJ, 453, 284. ROSAT observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Slane *et al.* 1997, ApJ, 485, 221. ROSAT observations.  
 Pineault *et al.* 1997, A&A, 324, 1152. DRAO at 408 MHz ( $3'.5$ ) and 1.4 GHz ( $1'.0$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.  
 Brazier *et al.* 1998, MNRAS, 295, 819. Studies of central, compact γ-ray source.

**G120.1+1.4**

Tycho, 3C10, SN1572

**RA:** 00<sup>h</sup>22<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 56**Size/arcmin:** 8**Dec:** +63°52'**Spectral index:** 0.61**Type:** S

This is the remnant of the Tycho’s SN of AD1572.

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

**Optical:** Faint filaments/knots to the NNW, NE and E.

**X-ray:** Shell, coincident with the radio shell, brighter to the NE.

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

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

**References:**

- Duin & Strom 1975, A&A, 39, 33. WSRT at 610 MHz ( $57'' \times 64''$ ) and 5 GHz ( $7'' \times 8''$ ).  
 Klein *et al.* 1979, A&A, 76, 120. Effelsberg 100-m at 10.7 GHz ( $1'.2 : S = 13.1 \pm 0.8$ ), plus review of flux densities.  
 Strom *et al.* 1982, MNRAS, 200, 473. WSRT at 1415 MHz ( $27'' \times 31''$ ) from 1971 and 1979, for expansion.  
 Dickel *et al.* 1982, ApJ, 257, 145. Comparison of Radio, X-ray and Optical.  
 Reid *et al.* 1982, ApJ, 261, 485. IPC observations.  
 Seward *et al.* 1983, ApJ, 266, 287. HRI observations.  
 Tan & Gull 1985, MNRAS, 216, 949. 5km at 2.7 GHz ( $4''$ ) from 1980 and 1983, and OMT at 1.4 GHz ( $23''$ ) from 1965 and 1980, for expansion.  
 Albinson *et al.* 1986, MNRAS, 219, 427. HI observations.  
 Green & Gull 1987, MNRAS, 224, 1055. VLA HI absorption observations towards central radio source.  
 Smith *et al.* 1988, ApJ, 325, 288. EXOSAT spectrum and image (smoothed to  $13''$ ).  
 Dickel *et al.* 1991, AJ, 101, 2151. VLA at 1.4 and 5 GHz ( $1''.5$ ).  
 Wood *et al.* 1992, AJ, 103, 1338. VLA at 5 GHz ( $1''.5$ ) polarization studies.  
 Fink *et al.* 1994, A&A, 283, 635. X-ray spectra.  
 Vancura *et al.* 1995, ApJ, 441, 680. X-ray spectra and ROSAT image.  
 Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.  
 Schwarz *et al.* 1995, A&A, 299, 193. WSRT and Effelsberg 100-m at 1.4 GHz ( $50''$ ), and VLA at 1.4 GHz ( $13''$ ), for neutral hydrogen studies.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Hwang & Gotthelf 1997, ApJ, 475, 665. ASCA observations.  
 Reynoso *et al.* 1997, ApJ, 491, 816. VLA at 1.4 GHz ( $1''.4 \times 1''.5$ ) from 1984 and 1994 for expansion studies.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G126.2+1.6****RA:** 01<sup>h</sup>18<sup>m</sup>30<sup>s</sup>**Dec:** +64°00′**1-GHz flux/Jy:** 7**Spectral index:** varies**Size/arcmin:** 70**Type:** S?**Radio:** Poorly defined shell.**Optical:** Filaments detected.**References:**Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ : S = 6.8 ± 0.7) and 2.7 GHz (4′.4 : S = 3.9 ± 0.4).Blair *et al.* 1980, ApJ, 242, 592. Optical detection and spectra.

Rosado 1982, RMxAA, 5, 127. Optical spectra.

Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz (4′.4) and 4.8 GHz (2′.6).Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz (3′.5 × 3′.9 : S = 12 ± 2.5) and part at 1.4 GHz (1′.1 × 1′.0), plus review of flux densities.Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.**G127.1+0.5****RA:** 01<sup>h</sup>25<sup>m</sup>00<sup>s</sup>**Dec:** +62°55′**1-GHz flux/Jy:** 13**Spectral index:** 0.6**Size/arcmin:** 45**Type:** S

R5

Has been called G127.3+0.7.

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

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

Salter *et al.* 1978, A&A, 66, 77. Effelsberg 100-m at 2.7 GHz (4′.4), plus 5 and 8.7 GHz of the central source.

Pauls 1977, A&amp;A, 59, L13. Effelsberg 100-m at 1.4 GHz (9′ : S = 8 ± 1).

Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz (9′ : S = 10.8 ± 1.3).Pauls *et al.* 1982, A&A, 112, 120. WSRT at 610 MHz (56″ × 62″) and H<sub>I</sub> absorption to the point source with the VLA.

Geldzahler &amp; Shaffer 1982, ApJ, 260, L69. Observations of central source.

Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz (4′.4) and 4.8 GHz (2′.6).Goss & van Gorkom 1984, JApA, 5, 425. WSRT H<sub>I</sub> absorption of central source.Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz (3′.5 × 3′.9 : S = 17.9 ± 2.0) and 1.4 GHz (1′.13 × 1′.0 : S = 10.1 ± 0.8), plus review of flux densities.Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G130.7+3.1**

**RA:** 02<sup>h</sup>01<sup>m</sup>55<sup>s</sup>  
**Dec:** +64°35'

**1-GHz flux/Jy:** 33  
**Spectral index:** 0.10

3C58, SN1181

**Size/arcmin:** 9 × 5  
**Type:** F

This is the remnant of the SN of AD1181.

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

**Optical:** Faint filaments.

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

**Point sources:** Compact source in X-rays.

**Distance:** HI absorption indicates 3.2 kpc.

**References:**

- Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ( $58'' : S = 26.7 \pm 0.5$ ).  
 Wilson & Weiler 1976, A&A, 49, 357. WSRT at 610 MHz ( $58'' \times 64''$ ), 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, Natur, 299, 606. HI absorption distance.  
 Fesen 1983, ApJ, 270, L53. Optical spectra.  
 Reynolds & Aller 1985, AJ, 90, 2312. VLA at 1.4 GHz ( $2'$ ), for limits of shell.  
 Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT spectrum.  
 Green 1986, MNRAS, 218, 533. CLFST at 151 MHz ( $1'.2 \times 1'.3 : S = 36 \pm 4$ ), 5km at 2.7 GHz ( $4''$ ), plus IPC observations for limit on shell.  
 Green 1987, MNRAS, 225, 11P. Flux density increase at 408 MHz.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz ( $26''.5 : S = 24.2 \pm 1.4$ ).  
 Reynolds & Aller 1988, ApJ, 327, 845. VLA at 1.4 ( $2''.4$ ) and 4.9 GHz ( $2''.5$ ).  
 Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz ( $90'' : S = 15.0 \pm 2.0$ ), plus review of flux densities.  
 Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.  
 Green & Scheuer 1992, MNRAS, 258, 833. IRAS upper limits.  
 Roberts *et al.* 1993, A&A, 274, 427. HI absorption.  
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.  
 Helfand *et al.* 1995, ApJ, 453, 741. ROSAT observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G132.7+1.3**

**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

HB3

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

Has been called G132.4+2.2.

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

**Optical:** Complete, filamentary shell, shock excited spectra.

**X-ray:** Partial shell.

**Point sources:** Pulsar nearby.

**Distance:** Interaction with surroundings suggests 2.2 kpc.

**References:**

- van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ( $5' : S = 33.8 \pm 7.0$ ).  
 d'Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.  
 Read 1981, MNRAS, 194, 863. 6C at 151 MHz ( $4'.4$ ) and HMT at 1.4 GHz ( $2'$ ) showing HI shell.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Fesen & Gull 1983, PASP, 95, 196. Optical image.  
 Leahy *et al.* 1985, ApJ, 294, 183. IPC observations.  
 Landecker *et al.* 1987, AJ, 94, 111. DRAO at 408 MHz ( $3'.5 \times 4' : S = 75 \pm 15$ ), plus review of flux densities.  
 Routledge *et al.* 1991, A&A, 247, 529. DRAO at 1.4 GHz ( $1'.0 \times 1'.1$ ) for HI, plus CO observations.  
 Fesen *et al.* 1995, AJ, 110, 2876. Optical imaging and spectroscopy, DRAO at 408 MHz ( $3'.5 \times 4'$ ) and 1.4 GHz ( $1'.0 \times 1'.1$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**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, A&A, 77, 93. Bologna at 408 MHz ( $4'.2 \times 110' : S = 30 \pm 30\%$ ).  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.



**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, A&A, 246, L28. ROSAT detection.  
 Reich *et al.* 1992, A&A, 256, 214. Effelsberg 100-m at 1.4 (9′ :  $S=4.2\pm 1.0$ ) and 2.7 GHz (4′.3 :  $S=3.0\pm 1.0$ ), plus HI and IRAS.  
 Yamauchi *et al.* 1993, PASJ, 45, 795. Hard X-ray observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

**G160.9+2.6**

**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

HB9

Has been called G160.5+2.8 and G160.4+2.8.

**Radio:** Large, filamentary shell.

**Optical:** Incomplete shell.

**X-ray:** Centrally brightened.

**Point sources:** Pulsar within boundary of the remnant, plus several nearby compact radio sources.

**Distance:** Various observations suggests less than 4 kpc.

**References:**

d’Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.  
 Damashek *et al.* 1978, ApJ, 225, L31. Pulsar.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Dwarakanath *et al.* 1982, JApA, 3, 207. Radio observations at 34.5 MHz (26′ × 40′ :  $S=750\pm 150$ ), plus review of flux densities.  
 van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source.  
 Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.  
 Leahy 1988, ApJ, 322, 917. IPC observations.  
 Leahy & Roger, 1991, AJ, 101, 1033. DRAO at 408 MHz (3′.5 × 4′.8) and 1.4 GHz (1′.0 × 1′.4), including HI and discussion of distance.  
 Yamauchi & Koyama 1993, PASJ, 45, 545. Hard X-ray observations.  
 Leahy & Aschenbach 1995, A&A, 293, 853. ROSAT observations.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G166.0+4.3**

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

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

**Size/arcmin:** 55 × 35  
**Type:** S

VRO 42.05.01

**Radio:** Two arcs of strikingly different radii.

**Optical:** Nearly complete ring.

**X-ray:** Predominantly in SW.

**Distance:** HI indicates 4.5 kpc.

**References:**

van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.  
 Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz (5′ :  $S=5.2\pm 1.0$ ).  
 Lozinskaya 1979, AuJPh, 32, 113. H $\alpha$  interferometry.  
 Landecker *et al.* 1982, ApJ, 261, L41. DRAO at 1.4 GHz (1′.0 × 1′.4), plus review of flux densities.  
 Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.  
 Pineault *et al.* 1985, A&A, 151, 52. VLA at 1.4 GHz (16″ × 20″) of part of remnant, and optical.  
 Pineault *et al.* 1987, ApJ, 315, 580. DRAO and VLA combined at 1.4 GHz (20″).  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Braun & Strom 1986, A&AS, 63, 345. WSRT HI Observations.  
 Landecker *et al.* 1989, MNRAS, 237, 277. DRAO at 1.4 GHz (1′.0 × 1′.4), including HI.  
 Burrows & Guo 1994, ApJ, 421, L19. ROSAT images and spectra.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Guo & Burrows 1997, ApJ, 480, L51. ASCA observations.  
 Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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

**Radio:** Large, faint shell.

**Optical:** Nearly complete ring.

**Distance:** HI indicates  $8 \pm 2$  kpc.

**References:**

Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ( $5′ : S = 6.0 \pm 2.2$ ).

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo 111 MHz.

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

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

Routledge *et al.* 1986, MNRAS, 221, 809. DRAO at 1.4 GHz ( $1′ \times 1′.4 : S = 9.0 \pm 0.5$ ) including HI, plus review of flux densities.

Kim *et al.* 1988, AJ, 96, 704. VLA of background sources for magnetic field structure of the remnant.

Leahy & Marshall 1988, MNRAS, 235, 805. IRAS observations.

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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<b>G179.0+2.6</b>			
<b>RA:</b> 05 <sup>h</sup> 50 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 7	<b>Size/arcmin:</b> 70	
<b>Dec:</b> +31°05′	<b>Spectral index:</b> 0.4	<b>Type:</b> S?	

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

**References:**

Fürst & Reich 1986, A&A, 154, 303. Effelsberg 100-m at 1.4 ( $9′.4$ ), 2.7 ( $4′.3$ ) and 4.75 GHz ( $2′.4$ ).

Fürst *et al.* 1989, A&A, 223, 66. Observations of central, extragalactic source.

Lorimer *et al.* 1998, A&A, 331, 1002. Pulsar search.

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

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

**Optical:** Wispy ring.

**X-ray:** Possible detection.

**Point sources:** Pulsar within boundary.

**References:**

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

Sofue *et al.* 1980, PASJ, 32, 1. Effelsberg 100-m at 5 GHz ( $2′.6$ ) of parts.

Kundu *et al.* 1980, A&A, 92, 225. Effelsberg 100-m at 2.7 GHz ( $5′.5 : S = 34.9 \pm 4$ ) and 1.6 GHz ( $10′ : S = 60.2 \pm 6$ ).

Angerhofer & Kundu 1981, AJ, 86, 1003. Arecibo at 430 MHz ( $9′ : S = 97 \pm 20$ ).

Fürst *et al.* 1982, A&A, 115, 428. Observations of compact radio sources near the remnant.

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

Fürst & Reich 1986, A&A, 163, 186. Effelsberg 100-m at 1.4, 2.7 and 4.7/5.0 GHz ( $9′.4, 4′.3$  and  $2′.4/2′.6$ ).

Sauvageot *et al.* 1990, A&A, 227, 183. EXOSAT possible detection.

Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

Anderson *et al.* 1996, ApJ, 468, L55. Pulsar detection.

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<b>G182.4+4.3</b>			
<b>RA:</b> 06 <sup>h</sup> 05 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 1.2	<b>Size/arcmin:</b> 50	
<b>Dec:</b> +29°00′	<b>Spectral index:</b> 0.4	<b>Type:</b> S	

**Radio:** Incomplete shell.

**References:**

Kothes *et al.* 1998, A&A, 331, 661. Effelsberg 100-m at 1.4, 2.7, 4.9 and 10.5 GHz ( $9′.4 : S = 0.36 \pm 0.08$ ,  $4′.4 : S = 0.25 \pm 0.04$ ,  $2′.5 : S = 0.20 \pm 0.02$  and  $1′.2 : S = 0.15 \pm 0.03$ ), plus X-ray upper limit.

**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, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz (58″ :  $S=499.3 \pm 1.0$ ).  
 Clark *et al.* 1983, MNRAS, 204, 415. 3-D optical structure.  
 Velusamy 1984, Natur, 308, 251. VLA at 1.4 GHz, radio detection of ‘jet’.  
 Harnden & Seward 1984, ApJ, 283, 279. X-ray observations.  
 Velusamy 1985, MNRAS, 212, 359. VLA at 1.4 GHz (15″).  
 Aller & Reynolds 1985, ApJ, 293, L73. Flux density decrease.  
 Mezger *et al.* 1986, A&A, 167, 145. 249-GHz map (120″).  
 Fesen & Gull 1986, ApJ, 306, 259. Deep [OIII] imagery of ‘jet’.  
 Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz (26″.5 :  $S < 417$ ).  
 Romani *et al.* 1990, ApJ, 349, L51. HI and IR of surroundings.  
 Marcelin *et al.* 1990, A&A, 228, 471. Optical of ‘jet’.  
 Fesen & Blair 1990, ApJ, 351, L45. Optical identification of dust in filaments.  
 Hester *et al.* 1990, ApJ, 357, 539. Optical and IR images.  
 Graham *et al.* 1990, ApJ, 352, 172. IR spectroscopy and imaging.  
 Hickson & van den Bergh 1990, ApJ, 365, 224. Optical polarization.  
 Bietenholz & Kronberg 1990, ApJ, 357, L13. VLA at 1.4 GHz (1″.8).  
 MacAlpine & Uomoto 1991, AJ, 102, 218. Photometry.  
 Michel *et al.* 1991, ApJ, 368, 463. Optical photometry.  
 Bietenholz *et al.* 1991, ApJ, 373, L59. VLA at multiple epochs for expansion studies.  
 Véron-Cetty & Woltjer 1991, A&A, 251, L31. Limits on optical variations.  
 Hennessy *et al.* 1992, ApJ, 395, L13. UV imagery.  
 Fesen *et al.* 1992, ApJ, 399, 599. Optical studies of ‘dark bays’.  
 Blair *et al.* 1992, ApJ, 399, 611. Far UV observations.  
 Bietenholz & Kronberg 1992, ApJ, 393, 206. VLA at 1.5 and 5 GHz (1″.8) and 1.5 and 14 GHz (6″.5) for spectral studies.  
 Strom & Greidanus 1992, Natur, 358, 654. IRAS observations.  
 Fesen & Staker 1993, MNRAS, 263, 69. [OIII] imaging of ‘jet’, and proper motion studies.  
 Kassim *et al.* 1993, AJ, 106, 2218. VLA at 74 MHz (20″).  
 Véron-Cetty & Woltjer 1993, A&A, 270, 370. Continuum and [OIII] photometry.  
 Nolan *et al.* 1993, ApJ, 409, 697.  $\gamma$ -ray observations.  
 Strong *et al.* 1993, A&AS, 97, 133.  $\gamma$ -ray observations  
 Murdin 1994, MNRAS, 269, 89. Deep H $\alpha$  plates and spectroscopy of halo.  
 Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.  
 MacAlpine *et al.* 1994, ApJ, 432, L131. Prominent optical knots.  
 Rudy *et al.* 1994, ApJ, 426, 646. IR spectroscopy.  
 Tanimori *et al.* 1994, ApJ, 429, L61.  $\gamma$ -rays from pulsar.  
 Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.  
 Lawrence *et al.* 1995, AJ, 109, 2635. Optical imaging spectroscopy.  
 Frail *et al.* 1995, ApJ, 454, L129. VLA at 333 MHz (20″) for limits on shell.  
 MacAlpine *et al.* 1996, ApJ, 463, 650. Optical spectroscopy of N and S rich filaments.  
 Nasuti *et al.* 1996, A&A, 314, 849. Spectrophotometry of pulsar.  
 Bietenholz *et al.* 1997, ApJ, 490, 291. Comparison of VLA observations at 74 MHz, 327 MHz, 1.5 GHz and 5 GHz for spectral index studies.  
 Blair *et al.* 1997, ApJS, 109, 473. HST imaging.  
 van der Meulen *et al.* 1998, A&A, 330, 321.  $\gamma$ -ray observations.  
 Tanimori *et al.* 1998, ApJ, 492, L33.  $\gamma$ -ray observations.  
 Nugent 1998, PASP, 110, 831. Optical expansion.

**G189.1+3.0**

IC443, 3C157

**RA:** 06<sup>h</sup>14<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 160**Size/arcmin:** 45**Dec:** +22°36′**Spectral index:** 0.36**Type:** S**Radio:** Limb-brightened to NE, with faint extension to the E.**Optical:** Brightest to the NE, with faint filaments outside the NE boundary.**X-ray:** Shell, brightest to the NE.**Distance:** Mean optical velocity suggests 0.7–1.5 kpc, association with S249 gives 1.5–2 kpc.**References:**

- Duin & van der Laan 1975, A&A, 40, 111. WSRT at 610 MHz ( $1' \times 2'.5$ ), 1415 MHz ( $24'' \times 63''$ ), and part at 5 GHz ( $12'' \times 31''$ ).  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Fesen 1984, ApJ, 281, 658. Optical of filament to far NE.  
 Erickson & Mahoney 1985, ApJ, 290, 596. TPT at 4 frequencies between 31 and 74 MHz ( $13' \times 11'$  to  $5'.4 \times 4'.7$ ), plus review of flux densities.  
 Braun & Strom 1986, A&A, 164, 193. WSRT at 327 MHz ( $72'' \times 185''$ ) and 1.4 GHz ( $17'' \times 43''$ ), plus H $\alpha$  and IRAS.  
 Green 1986, MNRAS, 221, 473. CLFST at 151 MHz ( $1'.2 \times 3'.1$ ) and HMT at 1.4 GHz ( $2'.1 \times 5'.4$ ).  
 Mufson *et al.* 1986, AJ, 92, 1349. Radio, IR, optical, UV and X-ray comparison, including VLA at 1.6 GHz ( $3''.8 \times 3''.3$  and  $40''$ ).  
 White *et al.* 1987, A&A, 173, 337. Observations of shocked molecular species.  
 Graham *et al.* 1987, ApJ, 313, 847. IR spectroscopy.  
 Burton *et al.* 1988, MNRAS, 231, 617. Molecular hydrogen imaging of shocked material.  
 Brown *et al.* 1988, ApJ, 334, 852. [Fex] optical imaging.  
 Dickel *et al.* 1989, AJ, 98, 1363. VLA at 1.4 GHz ( $1''.1 \times 1''.2$ ) of NE.  
 Petre *et al.* 1988, ApJ, 335, 215. IPC, HRI 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 $_2$ .  
 Sauvageot *et al.* 1990, A&A, 232, 203. [Fex] and [FexIV] imaging.  
 Moorhouse *et al.* 1991, MNRAS, 253, 662. Observations of shocked molecular H $_2$ .  
 Wood *et al.* 1991, AJ, 102, 224. VLA at 5 GHz ( $3''.6 \times 3''.8$ ) of northeast, including polarization.  
 Teske 1991, ApJ, 383, 233. [Fex] and [FexIV] imaging.  
 Wang & Scoville 1992, ApJ, 386, 158. Observations of shocked molecular species.  
 Wang *et al.* 1992, PASJ, 44, 303. Ginga X-ray observations.  
 Turner *et al.* 1992, ApJ, 399, 114. Observations of shocked molecular species.  
 Dickman *et al.* 1992, ApJ, 400, 203. Observations of shocked molecular species.  
 Inoue *et al.* 1993, PASJ, 45, 539. Observations of shocked molecular H $_2$ .  
 van Dishoeck *et al.* 1993, A&A, 279, 541. Observations of shocked molecular species.  
 Asaoka & Aschenbach 1994, A&A, 284, 573. X-ray, including possible overlapping remnant.  
 White 1994, A&A, 283, L25. Observations of shocked molecular species.  
 Tauber *et al.* 1994, ApJ, 421, 570. Observations of shocked molecular species.  
 Richter *et al.* 1995, ApJ, 454, 277. Observations of shocked molecular H $_2$ .  
 Esposito *et al.* 1996, ApJ, 461, 820. Associated  $\gamma$ -ray emission.  
 Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.  
 Keohane *et al.* 1997, ApJ, 484, 350. ASCA observations.  
 Caussen *et al.* 1997, ApJ, 489, 143. VLA of associated OH masers.

**G192.8–1.1**

PKS 0607+17

**RA:** 06<sup>h</sup>06<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** 20?**Size/arcmin:** 78**Dec:** +17°20′**Spectral index:** 0.6?**Type:** S

Has been called G193.3–1.5. Has been regarded as part of the Origem Loop, a supposed larger remnant.

**Radio:** In complex region.**Optical:** Encompasses S261 and S254–258.**References:**

- Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz ( $9' : S = 13 \pm 15\%$ ).  
 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 ( $1' \times 3'.3 : S = 18 \pm 3$ ).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**G205.5+0.5**

**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

Monoceros Nebula

**Size/arcmin:** 220  
**Type:** S

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

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

**X-ray:** Possibly detected.

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

**References:**

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (9′).  
 Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz (5′), part only.  
 Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo at 111 MHz (1′:S=462±180) and S(610)=245.  
 Davies *et al.* 1978, A&AS, 31, 271. Deep optical plates.  
 Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.  
 Graham *et al.* 1982, A&A, 109, 145. Effelsberg 100-m at 2.7 GHz (4′.4:S=97.6±12.5), plus review of flux densities.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Leahy *et al.* 1986, MNRAS, 220, 501. IPC observations.  
 Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz (24′, 19′ and 16′).  
 Esposito *et al.* 1996, ApJ, 461, 820. Possible associated  $\gamma$ -ray emission.  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.  
 Oliver *et al.* 1996, A&A, 315, 578. CO observations of some of surroundings.  
 Jaffe *et al.* 1997, ApJ, 484, L129.  $\gamma$ -ray detection.

**G206.9+2.3**

**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

PKS 0646+06

**Size/arcmin:** 60 × 40  
**Type:** S?

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

**Optical:** Filaments detected.

**X-ray:** Possibly detected.

**References:**

Davies & Meaburn 1978, A&A, 69, 443. Optical.  
 Nousek *et al.* 1981, ApJ, 248, 152. HEAO-1 X-ray limit.  
 Graham *et al.* 1982, A&A, 109, 145. Effelsberg 100-m at 2.7 GHz (4′.4:S=4.1±0.6), plus review of flux densities.  
 Rosado 1982, RMxAA, 5, 127. Optical.  
 Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.  
 Leahy *et al.* 1986, MNRAS, 220, 501. IPC observations.  
 Odegard 1986, ApJ, 301, 813. TPT at 20.6, 25.6 and 30.9 MHz (24′, 19′ and 16′).  
 Biggs & Lyne 1996, MNRAS, 282, 691. Pulsar search.

**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, A&A, 77, 93. Bologna at 408 MHz (4′.2 × 110′:S=23±20%).

**G260.4 – 3.4**

**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

Puppis A, MSH 08–44

**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.

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

**Distance:** Association with HI gives  $2.2 \pm 0.3$  kpc.

**References:**

- Green 1971, AuJPh, 24, 773. Molonglo at 408 MHz ( $3' : S = 198 \pm 20$ ).  
 Goudis & Meaburn 1978, A&A, 62, 283. H $\alpha$ +NII optical image.  
 Winkler *et al.* 1981, ApJ, 245, 574. X-ray spectroscopy of O lines.  
 Winkler *et al.* 1981, ApJ, 245, L27. X-ray spectrum.  
 Petre *et al.* 1982, ApJ, 258, 22. HRI observations.  
 Milne *et al.* 1983, MNRAS, 204, 237. FIRST at 1415 MHz (50''), large scale emission missing.  
 Teske & Petre 1987, ApJ, 318, 370. Coronal optical line emission.  
 Dubner & Arnal 1988, A&AS, 75, 363. HI and CO observations of surroundings.  
 Arendt *et al.* 1990, ApJ, 350, 266. MOST at 843 MHz (44'' × 65''), with large scale emission added, plus IR, optical and X-ray observations.  
 Dubner *et al.* 1991, AJ, 101, 1466. VLA at 327 MHz (43'' × 73'') and 1.5 GHz (43'' × 77'').  
 Arendt *et al.* 1991, ApJ, 368, 474. IR observations.  
 Milne *et al.* 1993, MNRAS, 261, 366. Parkes 64-m at 4.75 (4'.5 : S = 59 ± 5) and 8.4 GHz (3' : S = 38 ± 4), plus polarization.  
 Berthiaume *et al.* 1994, ApJ, 425, 132. X-ray spectroscopy.  
 Sutherland & Dopita 1995, ApJ, 439, 365. Spectrophotometry.  
 Reynoso *et al.* 1995, AJ, 110, 318. VLA at 1.4 GHz (90'') including neutral hydrogen.  
 Blair *et al.* 1995, ApJ, 454, L35. Far UV spectroscopy.  
 Petre *et al.* 1996, ApJ, 465, L43. ROSAT of central source.

**G261.9 + 5.5**

**RA:** 09<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, AuJPh, 20, 297. Parkes 64-m at 2650 MHz (7'.5 : S = 7) also S(1410) = 8, S(81.5) = 25.  
 Colomb & Dubner 1980, A&A, 82, 244. Argentine 30-m dish at 1.4 GHz, for HI possibly associated with remnant.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44'' × 71'').  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G263.9 – 3.3**

**RA:** 08<sup>h</sup>32<sup>m</sup>30<sup>s</sup>  
**Dec:** –45°35′

**1-GHz flux/Jy:** 1750  
**Spectral index:** varies

Vela (XYZ)

**Size/arcmin:** 255  
**Type:** C

This refers to the whole Vela XYZ complex, of which X has at times been classified as a separate (filled-centre) remnant.

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

**Optical:** Filaments.

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

**Point sources:** Pulsar within Vela X, with one-sided ‘jet’.

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

**References:**

- Milne 1968, AuJPh, 21, 201. Parkes 64-m at various frequencies, including 408 MHz (48′ :  $S=2300\pm300$ ), 635 MHz (31′ :  $S=2360\pm300$ ), 1410 MHz (14′ :  $S=1640\pm300$ ) and 2650 MHz (7′.5 :  $S=1400\pm250$ ), plus discussion of the distance.  
 van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.  
 Dopita *et al.* 1977, ApJ, 214, 179. Optical spectroscopy.  
 Hearn *et al.* 1980, ApJ, 235, L67. X-ray map.  
 Milne 1980, A&A, 81, 293. Maps of Vela X with Parkes 64-m at 1.66, 2.7 and 5 GHz (12′, 8′.4 and 4′.4).  
 Weiler & Panagia 1980, A&A, 90, 269. Clarify notation of this region and review previous observations.  
 Kahn *et al.* 1985, ApJ, 299, 821. IPC observations.  
 Harnden *et al.* 1985, ApJ, 299, 828. IPC and HRI observations of Vela X and pulsar.  
 Bignami & Caraveo 1988, ApJ, 325, L5. Pulsar proper motion from optical observations.  
 Dwarakanath 1991, JApA, 12, 199. Gauribidanur ‘T’ array at 34.5 MHz (26′ × 84′ :  $S=1800$  for Vela X and  $S=3900$  for Vela YZ), plus review of flux densities.  
 Bietenholz *et al.* 1991, ApJ, 376, L41. VLA at 5 GHz in vicinity of pulsar.  
 Raymond *et al.* 1991, ApJ, 383, 226. UV spectroscopy.  
 Willmore *et al.* 1992, MNRAS, 254, 139. Hard X-ray observations.  
 Dubner *et al.* 1992, A&AS, 96, 505. Argentine 30-m at 1.4 GHz (30′) of surrounding HI.  
 Oberlack *et al.* 1994, ApJS, 92, 433.  $\gamma$ -ray observations.  
 Bocchino *et al.* 1994, ApJ, 437, 209. ROSAT observations of NE.  
 Aschenbach *et al.* 1995, Natur, 373, 587. ROSAT of X-ray extensions.  
 Strom *et al.* 1995, Natur, 373, 590. Radio of X-ray extensions.  
 Markwardt & Ögelman 1995, Natur, 375, 40. X-ray jet from pulsar.  
 Jenkins & Wallerstein 1995, ApJ, 440, 227. Optical absorption of associated neutral carbon cloud.  
 Milne 1995, MNRAS, 277, 1435. Parkes 64-m at 8.4 GHz (3′), including polarization, of Vela X.  
 Duncan *et al.* 1996, MNRAS, 280, 252. Parkes 64-m at 2.4 GHz (8′.9).  
 Danks & Sembach 1995, AJ, 109, 2627. Optical spectroscopy of background stars.  
 de Jager *et al.* 1996, ApJ, 460, 729.  $\gamma$ -ray detection.  
 Blair *et al.* 1995, AJ, 110, 312. UV spectroscopy.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″) of part.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.  
 Frail *et al.* 1997, ApJ, 475, 224. VLA at 330 MHz (1′ × 1′.8) and comparison with ROSAT observations of Vela X.  
 Markwardt & Ögelman 1997, ApJ, 480, L13. ASCA observations of pulsar ‘jet’.  
 Raymond *et al.* 1997, ApJ, 482, 881. UV spectroscopy.  
 Yoshikoshi *et al.* 1997, ApJ, 487, L65.  $\gamma$ -ray observations of pulsar.  
 Winkler & Long 1997, ApJ, 491, 829. ROSAT and optical observations.  
 Jenkins *et al.* 1998, ApJ, 492, L147. UV absorption to background star.

**G272.2 – 3.2**

**RA:** 09<sup>h</sup>05<sup>m</sup>15<sup>s</sup>  
**Dec:** –51°50′

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

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

**Radio:** Diffuse shell.

**X-ray:** Centrally brightened.

**Optical:** Detected.

**References:**

- Greiner *et al.* 1994, A&A, 286, L35. ROSAT observations, plus optical.  
 Duncan *et al.* 1997, MNRAS, 289, 97. Parkes 64-m at 1.4 GHz (18′ :  $S=0.38\pm0.09$ ) 2.4 GHz (10′.6 :  $S=0.25\pm0.04$ ) and 4.8 GHz (5′.7 :  $S=0.17\pm0.02$ ), MOST at 843 MHz (45″ × 70″ :  $S=0.45\pm0.10$ ), and ATCA at 2.4 GHz (37″ × 52″), plus ROSAT observations.

**G279.0+1.1****RA:** 09<sup>h</sup>56<sup>m</sup>00<sup>s</sup>**Dec:** –53°00′**1-GHz flux/Jy:** 30?**Spectral index:** 0.6?**Size/arcmin:** 95**Type:** S**Radio:** Faint, incomplete shell.**Point sources:** Pulsar nearby.**References:**

Woermann & Jonas 1988, MNRAS, 234, 971. Hartesbeesthoek 26-m at 1.6 (30′ :  $S=25.2\pm4$ ) and 2.3 GHz (20′ :  $S=20.7\pm3$ ).  
 Duncan *et al.* 1995, MNRAS, 277, 319. Parkes 64-m at 1.4 (18′ :  $S=28\pm3$ ) and 2.4 GHz (11′ :  $S=20\pm2$ ), including polarization.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 53″) of part.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G284.3 – 1.8****RA:** 10<sup>h</sup>16<sup>m</sup>30<sup>s</sup>**Dec:** –58°45′**1-GHz flux/Jy:** 11?**Spectral index:** 0.3?

MSH 10–53

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

Has been called G284.2–1.8.

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

Ruiz & May 1986, ApJ, 309, 667. CO and optical observations.  
 Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43″ × 50″) and Parkes 64-m at 8.4 GHz (3′ :  $S=5.4\pm0.8$ ) including polarization, plus earlier flux densities.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.

**G286.5 – 1.2****RA:** 10<sup>h</sup>33<sup>m</sup>50<sup>s</sup>**Dec:** –59°26′**1-GHz flux/Jy:** 1.4?**Spectral index:** ?**Size/arcmin:** 26 × 6**Type:** S?**Radio:** Double, elongated arc.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S=1.6$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G289.7 – 0.3****RA:** 10<sup>h</sup>59<sup>m</sup>10<sup>s</sup>**Dec:** –60°02′**1-GHz flux/Jy:** 6.2**Spectral index:** 0.2?**Size/arcmin:** 18 × 14**Type:** S**Radio:** Incomplete shell.**Point sources:** Compact radio source near centre.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S=6.4\pm0.5$ ), plus Parkes 64-m at 4.5 GHz ( $S=7.5\pm2.5$ ) and 8.55 GHz ( $S=3.6\pm0.9$ ).



**G290.1 – 0.8**

**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

MSH 11–61A

**Size/arcmin:** 19 × 14  
**Type:** S

**Radio:** Elongated, clumpy shell.

**Optical:** Filaments detected.

**X-ray:** Detected.

**Point sources:** Pulsar nearby.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 :  $S=20.2$ ).  
 Elliot & Malin 1979, MNRAS, 186, 45P. Optical image and spectra.  
 Kirshner & Winkler 1979, ApJ, 227, 853. Optical.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 50″).  
 Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43″ × 49″ :  $S=45 \pm 11$ ), and Parkes 64-m at 8.4 GHz (3′ :  $S=19.5 \pm 1.0$ ), including polarization.  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ :  $S=43$ ).  
 Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.  
 Kaspi *et al.* 1997, ApJ, 485, 820. Pulsar detection.  
 Gotthelf & Kaspi 1998, ApJ, 497, L29. ASCA observations of pulsar.

**G291.0 – 0.1**

**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

(MSH 11–62)

**Size/arcmin:** 15 × 13  
**Type:** C

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

**X-ray:** Centrally brightened.

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Roger *et al.* 1986, MNRAS, 219, 815. MOST at 843 MHz (43″ × 50″ :  $S=17.2 \pm 1.0$ ), and Parkes 64-m at 5 and 8.4 GHz (4′.6 and 3′ :  $S=10.4 \pm 0.4$  and 9′.1 ± 0.2), with polarization.  
 Wilson 1986, ApJ, 302, 718. IPC observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ :  $S=12.7$ ).  
 Harrus *et al.* 1998, ApJ, 499, 273. ASCA observations.

**G292.0 + 1.8**

**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

MSH 11–54

**Size/arcmin:** 12 × 8  
**Type:** C?

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

**Optical:** Oxygen rich.

**X-ray:** Ring of emission.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Goss *et al.* 1979, MNRAS, 188, 357. Optical spectra.  
 Lockhart *et al.* 1977, MNRAS, 179, 147. Fleurs at 1415 MHz (50″ :  $S=13.0$ ).  
 Clark *et al.* 1980, MNRAS, 193, 129. X-ray spectrum.  
 Tuohy *et al.* 1982, ApJ, 260, L65. HRI observations.  
 Dopita & Tuohy 1984, ApJ, 282, 135. Optical spectra.  
 Braun *et al.* 1986, A&A, 162, 259. MOST at 843 MHz (0′.8) and IRAS.  
 Hughes & Singh 1994, ApJ, 422, 126. EXOSAT spectrum.  
 Sutherland & Dopita 1995, ApJ, 439, 365. Spectrophotometry.

**G293.8+0.6****RA:** 11<sup>h</sup>32<sup>m</sup>40<sup>s</sup>**Dec:** –60°37′**1-GHz flux/Jy:** 5?**Spectral index:** 0.6?**Size/arcmin:** 20**Type:** C**Radio:** Central source, with faint extended plateau.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=9.0$ ) and Parkes 64-m at 5 GHz (4′ :  $S=2.1$ ).

Kesteven &amp; Caswell 1987, A&amp;A, 183, 118. MOST at 843 MHz (44″ × 51″).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ :  $S=2.6$ ).**G294.1 – 0.0****RA:** 11<sup>h</sup>33<sup>m</sup>50<sup>s</sup>**Dec:** –61°22′**1-GHz flux/Jy:** >2?**Spectral index:** ?**Size/arcmin:** 40**Type:** S**Radio:** Faint shell.**References:**Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ :  $S > 2$ ).**G296.1 – 0.5****RA:** 11<sup>h</sup>48<sup>m</sup>40<sup>s</sup>**Dec:** –62°17′**1-GHz flux/Jy:** 8?**Spectral index:** 0.6?**Size/arcmin:** 37 × 25**Type:** S

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

**Radio:** Irregular shell, with nearby HII regions.**Optical:** Detected.**X-ray:** Detected.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=6.9$ ) and Parkes 64-m at 5 GHz (4′ :  $S > 0.74$ ) poor 5-GHz map (of G296.1–0.7).Longmore *et al.* 1977, MNRAS, 181, 541. Optical spectra.

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

Markert *et al.* 1981, ApJ, 248, L17. IPC observations.Caswell & Barnes 1983, ApJ, 271, L55. Molonglo at 408 MHz (3′ :  $S=12.4$ ).Biggami *et al.* 1986, ApJ, 302, 606. EXOSAT, IPC and HRI observations.

Hwang &amp; Markert 1994, ApJ, 431, 819. ROSAT observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ :  $S > 2.4$ ).Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G296.5+10.0**

PKS 1209–51/52

**RA:** 12<sup>h</sup>07<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 48**Size/arcmin:** 90 × 65**Dec:** –52° 10′**Spectral index:** 0.5**Type:** S

Has been called G296.5+9.7.

**Radio:** Shell with two bright limbs.

**Optical:** Detected.

**X-ray:** Incomplete shell, with central compact source.

**Point sources:** Central neutron star.

**References:**

Irvine & Irvine 1974, ApJ, 192, L111. Optical.

Danziger & Dennefeld 1976, PASP, 88, 44. Optical spectra.

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

Tuohy *et al.* 1979, ApJ, 230, L27. X-ray detection with HEAO-1 A2 experiment.

Ruiz 1983, AJ, 88, 1210. Optical spectra.

Dubner *et al.* 1986, AJ, 91, 343. Argentine 30-m dish at 1.4 GHz (34′), plus HI.

Kellett *et al.* 1987, MNRAS, 225, 199. EXOSAT of the west of the remnant, including the compact source.

Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 56″).

Matsui *et al.* 1988, ApJ, 329, 838. IPC and HRI observations, including compact source.

Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44″ × 56″).

Biggami *et al.* 1992, ApJ, 389, L67. Optical in vicinity of X-ray source.

Milne & Haynes 1994, MNRAS, 270, 106. Parkes 64-m at 2.4 GHz (8′.3 : S=33±3), 4.8 GHz (4′.5 : S=23.3±3) and 8.4 GHz (3′.0 : 18.8±3), including polarization and review of flux densities.

Mereghetti *et al.* 1996, ApJ, 464, 842. Radio, optical and X-ray observations of central source.

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.

Vasisht *et al.* 1997, ApJ, 476, L43. ASCA observations of neutron star.

Zavlin *et al.* 1998, A&A, 331, 821. ROSAT and ASCA observations of neutron star.

**G296.8 – 0.3**

1156–62

**RA:** 11<sup>h</sup>56<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 9**Size/arcmin:** 20 × 14**Dec:** –62° 18′**Spectral index:** 0.6**Type:** S

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

**Distance:** HI absorption gives  $9.6 \pm 0.6$  kpc.

**X-ray:** Detected.

**References:**

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

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

Hwang & Markert 1994, ApJ, 431, 819. ROSAT observations.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=9.2).

Gaensler *et al.* 1998, MNRAS, 296, 813. ATCA at 1.3 GHz (22″ × 24″ : S=7.0±0.3), including polarisation and HI observations, plus review of flux densities.

**G298.5 – 0.3****RA:** 12<sup>h</sup>10<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 5?**Size/arcmin:** 5?**Dec:** –62° 35′**Spectral index:** 0.4?**Type:** ?

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

**References:**

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

Hwang & Markert 1994, ApJ, 431, 819. ROSAT upper limit.

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=1.8).

**G298.6 – 0.0**

**RA:** 12<sup>h</sup>11<sup>m</sup>00<sup>s</sup>  
**Dec:** –62°20′

**1-GHz flux/Jy:** 5?  
**Spectral index:** 0.3

**Size/arcmin:** 12 × 9  
**Type:** S

Has been called G298.6–0.1.

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 50″).  
 Hwang & Markert 1994, ApJ, 431, 819. ROSAT upper limit.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=7.4).

**G299.2 – 2.9**

**RA:** 12<sup>h</sup>12<sup>m</sup>30<sup>s</sup>  
**Dec:** –65°13′

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

**Size/arcmin:** 18 × 11  
**Type:** S

**Radio:** Faint source.

**X-ray:** Centrally brightened.

**Optical:** Filaments in W.

**References:**

Busser *et al.* 1996, A&A, 310, L1. ROSAT detection, plus optical studies.  
 Slane *et al.* 1996, ApJ, 465, 840. Einstein, IRAS and radio observations.

**G299.6 – 0.5**

**RA:** 12<sup>h</sup>19<sup>m</sup>00<sup>s</sup>  
**Dec:** –62°52′

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

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

**Radio:** Faint shell, brightest to E.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=1.1).

**G301.4 – 1.0**

**RA:** 12<sup>h</sup>35<sup>m</sup>00<sup>s</sup>  
**Dec:** –63°33′

**1-GHz flux/Jy:** 2.1?  
**Spectral index:** ?

**Size/arcmin:** 37 × 23  
**Type:** S

**Radio:** Faint, incomplete shell, with possible extension to southwest.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=2.3).

**G302.3 + 0.7**

**RA:** 12<sup>h</sup>42<sup>m</sup>55<sup>s</sup>  
**Dec:** –61°52′

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

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

**Radio:** Distorted shell, in complex region, with possibly associated filament.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S=7.5) and Parkes 64-m at 5 GHz (4′ : S=3.0).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : S=3.2).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G304.6 + 0.1**

**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  
 Kes 17

**Radio:** Incomplete shell.

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 : S=6.9).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=18).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G308.1 – 0.7**

**RA:** 13<sup>h</sup>34<sup>m</sup>10<sup>s</sup>  
**Dec:** –62°49′

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

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

**Radio:** Faint shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=1.3).

**G308.8 – 0.1**

**RA:** 13<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, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S=16.7) and Parkes 64-m at 5 GHz (4′ : S=7.0).

Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 : S=6.5).

Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50″).

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

Caswell *et al.* 1992, ApJ, 399, L151. MOST at 843 MHz (43″ × 49″).

Kaspi *et al.* 1992, ApJ, 399, L155. Pulsar observations.

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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:** 15 × 12  
**Type:** S

Has been called G309.2–0.7.

**Radio:** Distorted shell.

**References:**

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

Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (1′.5).

Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 50″).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : S=6).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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:** 25 × 19  
**Type:** S

**Radio:** Distorted shell.

**Point sources:** Steep radio spectrum source near the centre of the remnant.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S=26.4) and Parkes 64-m at 5 GHz (4′ : S=7.4).

Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (1′).

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : S > 8.8).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G310.6 – 0.3**

**RA:** 14<sup>h</sup>01<sup>m</sup>40<sup>s</sup>  
**Dec:** –62°23′

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

**Kes 20B**  
**Size/arcmin:** 8  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

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

**G310.8 – 0.4**

Kes 20A

**RA:** 14<sup>h</sup>03<sup>m</sup>40<sup>s</sup>**1-GHz flux/Jy:** 6?**Size/arcmin:** 12**Dec:** –62°31′**Spectral index:** ?**Type:** S**Radio:** Arc in E, in complex region.**References:**

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

**G311.5 – 0.3****RA:** 14<sup>h</sup>02<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 3?**Size/arcmin:** 5**Dec:** –61°44′**Spectral index:** 0.5**Type:** S**Radio:** Shell, not well resolved.**References:**

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

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

Whiteoak &amp; Green 1996, A&amp;AS, 118, 329. MOST at 843 MHz (43'' × 49'' : S=2.9).

**G312.4 – 0.4****RA:** 14<sup>h</sup>09<sup>m</sup>20<sup>s</sup>**1-GHz flux/Jy:** 45**Size/arcmin:** 38**Dec:** –61°29′**Spectral index:** 0.36**Type:** S**Radio:** Irregular, incomplete shell.**References:**

Caswell &amp; Barnes 1985, MNRAS, 216, 753. Molonglo at 408 MHz (3' : S=56).

Whiteoak &amp; Green 1996, A&amp;AS, 118, 329. MOST at 843 MHz (43'' × 49'' : S &gt; 19), plus Parkes 64-m at 4.5 GHz (S=30±2) and 8.55 GHz (S=17±4).

Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.**G315.4 – 2.3**

RCW 86, MSH 14–63

**RA:** 14<sup>h</sup>39<sup>m</sup>00<sup>s</sup>**1-GHz flux/Jy:** 49**Size/arcmin:** 42**Dec:** –62°17′**Spectral index:** 0.6**Type:** S

Possibly the remnant of the SN of AD185?

**Radio:** Shell, brightest to the SW.**Optical:** Bright, radiative filaments, with some faint Balmer dominated filaments.**X-ray:** Partial shell, with bright patch.**Distance:** Possible association with OB stars suggests 2.5 kpc.**References:**van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3' : S=86) and Parkes 64-m at 5 GHz (4' : S=18.2).

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

Winkler 1978, ApJ, 221, 220. X-ray detection.

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

Pisarski *et al.* 1984, ApJ, 277, 710. IPC and HRI observationsNugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum.

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

Long &amp; Blair 1990, ApJ, 358, L13. Balmer dominated optical filaments.

Greidanus &amp; Strom 1990, A&amp;A, 240, 385. IRAS observations.

Kaastra *et al.* 1992, A&A, 264, 654. Ginga X-ray spectra.

Strom 1994, MNRAS, 268, L5. Historical association

Chin &amp; Huang 1994, Natur, 371, 398. Questioning of historical association.

Schaefer 1995, AJ, 110, 1793. Questioning of historical association.

Whiteoak &amp; Green 1996, A&amp;AS, 118, 329. MOST at 843 MHz (43'' × 48'' : S &gt; 22).

Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.Smith *et al.* 1997, AJ, 114, 2664. Observations of Balmer dominated filaments.Vink *et al.* 1997, A&A, 328, 628. ASCA spectroscopy.

**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:** 0.4

**Size/arcmin:** 24 × 13  
**Type:** ?

**Radio:** Irregular non-thermal emission, with HII region superposed in E.

**References:**

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

**G315.9 – 0.0**

**RA:** 14<sup>h</sup>34<sup>m</sup>40<sup>s</sup>  
**Dec:** –59°58′

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

**Size/arcmin:** 25 × 14  
**Type:** S

Has been called G315.8–0.0.

**Radio:** Faint, distorted shell, with steep-spectrum ‘jet’?

**References:**

Kesteven *et al.* 1987, AuJPh, 40, 855. MOST at 843 MHz (44″ × 50″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S=0.9$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.

**G316.3 – 0.0**

**RA:** 14<sup>h</sup>37<sup>m</sup>40<sup>s</sup>  
**Dec:** –59°47′

**1-GHz flux/Jy:** 20?  
**Spectral index:** 0.4

(MSH 14–57)  
**Size/arcmin:** 29 × 14  
**Type:** S

**Radio:** Distorted shell, with possible ‘blowout’.

**Distance:** HI absorption data suggests > 7.2 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 :  $S=16.7$ ).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 51″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S=20$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G317.3 – 0.2**

**RA:** 14<sup>h</sup>45<sup>m</sup>50<sup>s</sup>  
**Dec:** –59°34′

**1-GHz flux/Jy:** 4.7?  
**Spectral index:** ?

**Size/arcmin:** 11  
**Type:** S

**Radio:** Incomplete shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S=5.2$ ).

**G318.2 + 0.1**

**RA:** 14<sup>h</sup>51<sup>m</sup>00<sup>s</sup>  
**Dec:** –58°51′

**1-GHz flux/Jy:** >3.9?  
**Spectral index:** ?

**Size/arcmin:** 40 × 35  
**Type:** S

**Radio:** Faint shell, with central HII region.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ :  $S>4.3$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G318.9+0.4**

**RA:** 14<sup>h</sup>54<sup>m</sup>40<sup>s</sup>  
**Dec:** –58°17′

**1-GHz flux/Jy:** 4?  
**Spectral index:** 0.2?

**Size/arcmin:** 30 × 14  
**Type:** C

May not be a SNR?

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

**References:**

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

Whiteoak 1993, *ApJ*, 415, 701. MOST at 843 MHz (43'' × 51'' :  $S = 4.8 \pm 0.6$ ), Parkes 64-m at 4.5 GHz (4'.7 :  $S = 3.7 \pm 0.2$ ) and 8.4 GHz (2'.8 :  $S = 3.0 \pm 0.4$ ) including polarization, and ATCA at 1.4 GHz and 4.8 GHz (11'' × 13'') of core.

Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43'' × 50'' :  $S = 4.8$ ).

Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.

**G320.4–1.2**

**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

MSH 15–52, RCW 89

**Size/arcmin:** 35  
**Type:** C

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

**Radio:** Ragged shell.

**Optical:** RCW 89 is the H $\alpha$  emitting region to the NW.

**X-ray:** Partial shell, central nebula and pulsar and possible ‘jet’.

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

**Distance:** HI absorption indicates 4.2 kpc.

**References:**

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

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

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

Caswell *et al.* 1981, *MNRAS*, 195, 89. FIRST at 1415 MHz (50'').

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

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

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

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

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

Lortet *et al.* 1987, *A&A*, 180, 65. Optical observations.

Trussoni *et al.* 1990, *A&A*, 234, 403. EXOSAT observations.

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

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

Milne *et al.* 1993, *MNRAS*, 264, 853. Parkes 64-m at 4.8 GHz (4'.5 :  $S = 37 \pm 7$ ) and 8.4 GHz (3'.0 :  $S = 24 \pm 4$ ), including polarization and review of flux densities.

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

Chin & Huang 1994, *Natur*, 371, 398. Questioning of historical association.

Matz *et al.* 1994, *ApJ*, 434, 288. X-ray observations of pulsar.

Schaefer 1995, *AJ*, 110, 1793. Questioning of historical association.

Du Plessis *et al.* 1995, *ApJ*, 453, 746. Hartesbeesthoek 26-m at 2.3, 5 and 8.5 GHz ( $S = 42, 35.6, 14.5$ ).

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

Trassoni *et al.* 1996, *A&A*, 306, 581. ROSAT observations.

Tamura *et al.* 1996, *PASJ*, 48, L33. ASCA observations.

Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43'' × 50'' :  $S = 62$ ).

Green *et al.* 1997, *AJ*, 114, 2058. Parkes 64-m OH observations.

Marsden *et al.* 1997, *ApJ*, 491, L39. X-ray spectroscopy.

Brazier & Becker 1997, *MNRAS*, 284, 335. ROSAT observations.

**G320.6–1.6**

**RA:** 15<sup>h</sup>21<sup>m</sup>50<sup>s</sup>  
**Dec:** –59°27′

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

**Size/arcmin:** 60 × 30  
**Type:** S

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

**References:**

Milne *et al.* 1993, *MNRAS*, 264, 853. Parkes 64-m at 4.8 GHz (4'.5) and 8.4 GHz (3'.0), including polarization.

Whiteoak & Green 1996, *A&AS*, 118, 329. MOST at 843 MHz (43'' × 50'' :  $S > 9.3$ ).



**G321.9 – 1.1**

**RA:** 15<sup>h</sup>19<sup>m</sup>50<sup>s</sup>  
**Dec:** –58°02′

**1-GHz flux/Jy:** >3.4?  
**Spectral index:** ?

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

**Radio:** Faint shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 51″ :  $S > 3.8$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G321.9 – 0.3**

**RA:** 15<sup>h</sup>16<sup>m</sup>45<sup>s</sup>  
**Dec:** –57°23′

**1-GHz flux/Jy:** 13  
**Spectral index:** 0.3

**Size/arcmin:** 31 × 23  
**Type:** S

**Radio:** Shell brighter to the W, with Cir X-1 to N.

**Point sources:** Compact, probably thermal source at S edge.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 18.3$ ) and Parkes 64-m at 5 GHz (4′ :  $S = 7.8$ ).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 52″).  
 Stewart *et al.* 1993, MNRAS, 261, 593. ATCA at 1.5 GHz (21″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 51″ :  $S > 8.3$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G322.5 – 0.1**

**RA:** 15<sup>h</sup>19<sup>m</sup>30<sup>s</sup>  
**Dec:** –56°55′

**1-GHz flux/Jy:** 1.5  
**Spectral index:** 0.4

**Size/arcmin:** 15  
**Type:** C

**Radio:** Shell with central extended source.

**Point sources:** PN Pe 2-8 within boundary.

**References:**

Whiteoak 1992, MNRAS, 256, 121. MOST at 843 MHz (43″ × 51″ :  $S = 2.0 \pm 0.3$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 51″ :  $S = 1.7$ ), plus Parks 64-m at 4.5 GHz ( $= 0.89 \pm 0.13$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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:** 13  
**Type:** S

**Radio:** Distorted shell, confused with thermal emission.

**Point sources:** Compact, probably thermal source near centre.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S = 4.2$ ) and Parkes 64-m at 5 GHz (4′ :  $S = 1.5$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 52″ :  $S = 4.2$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G326.3 – 1.8**

**RA:** 15<sup>h</sup>49<sup>m</sup>00<sup>s</sup>  
**Dec:** –56°00′

**1-GHz flux/Jy:** 145  
**Spectral index:** varies

MSH 15–56

**Size/arcmin:** 38  
**Type:** C

Has been called G326.2–1.7.

**Radio:** Shell, with flat spectrum core.

**Optical:** Emission around the shell.

**X-ray:** Shell, with central extended emission.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ( $3' : S = 180$ ).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes H $\alpha$  absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz ( $0'.8 : S > 95$ ) and Parkes 64-m at 14.7 GHz ( $2'.2 : S = 69 \pm 8$ ).  
 van den Bergh 1979, ApJ, 227, 497. Optical observations.  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical observations.  
 Dennefeld 1980, PASP, 92, 603. Optical spectra.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ( $44'' \times 53''$ ).  
 Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz ( $43'' \times 52'' : S = 153 \pm 40$ ), and Parkes 64-m at 8.4 GHz ( $3' : S = 68 \pm 5$ ), including polarization.  
 Seward 1990, ApJS, 73, 781. IPC observations.  
 Kassim *et al.* 1993, ApJ, 419, 733. ROSAT image.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 52'' : S > 130$ ).  
 Rosado *et al.* 1996, A&A, 315, 243. Optical kinematics.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH 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:** 7?  
**Spectral index:** ?

**Size/arcmin:** 18  
**Type:** C

**Radio:** Shell, with off-centre core.

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

**References:**

Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz ( $8'.4 : S = 10 \pm 15\%$ ).  
 Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ( $3' : S = 10.6$ ) and Parkes 64-m at 5 GHz ( $4' : S = 4.3$ ).  
 Lamb & Markert 1981, ApJ, 244, 94. IPC observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 52'' : S = 7.6$ ).  
 Seward *et al.* 1996, ApJ, 471, 887. ROSAT observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G327.4+0.4**

**RA:** 15<sup>h</sup>44<sup>m</sup>30<sup>s</sup>  
**Dec:** –53°40′

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

Kes 27

**Size/arcmin:** 21  
**Type:** S

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

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

**X-ray:** Diffuse, best defined to E.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $3' : S = 58$ ) and Parkes 64-m at 5 GHz ( $4' : S = 12.4$ ).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ( $8'.4$ ) and 5 GHz ( $4'.4$ ).  
 Lamb & Markert 1981, ApJ, 244, 94. IPC observations.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ( $44'' \times 55''$ ).  
 Milne *et al.* 1989, PASAu, 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.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 53'' : S = 25$ ).  
 Seward *et al.* 1996, ApJ, 471, 887. ROSAT observations.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m and ATCA OH observations.

**G327.4+1.0**

**RA:** 15<sup>h</sup>43<sup>m</sup>00<sup>s</sup>  
**Dec:** –53°11′

**1-GHz flux/Jy:** 1.9?  
**Spectral index:** ?

**Size/arcmin:** 14  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 54'' : S = 2.1$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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

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

**Distance:** Optical spectra and proper motion indicate 1.7–3.1 kpc, modelling spectra gives  $1.8 \pm 0.3$  kpc.

**References:**

- van den Bergh 1976, ApJ, 208, L17. Optical.  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8'.4) and 5 GHz (4'.4).  
 Becker *et al.* 1980, ApJ, 240, L33. X-ray spectroscopy.  
 Schweizer & Middleditch 1980, ApJ, 241, 1039. Possible stellar remnant.  
 Pye *et al.* 1981, MNRAS, 194, 569. IPC observations.  
 Caswell *et al.* 1983, MNRAS, 204, 921. FIRST at 1415 MHz (77").  
 Reynolds & Gilmore 1986, AJ, 92, 1138. VLA at 1.37 and 1.67 GHz (16"  $\times$  20").  
 Kirshner *et al.* 1987, ApJ, 315, L135. Broad H $\alpha$  optical component.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44"  $\times$  66").  
 Fesen *et al.* 1988, ApJ, 327, 164. UV absorption spectra of the Schweizer-Middleditch star.  
 Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44"  $\times$  66" :  $S = 17.5 \pm 1.5$ ).  
 Long *et al.* 1988, ApJ, 333, 749. Optical proper motion for distance.  
 Jones & Pye 1989, MNRAS, 238, 567. EXOSAT observations.  
 Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.  
 Wu *et al.* 1993, ApJ, 416, 247. UV spectra.  
 Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.  
 Reynolds & Gilmore 1993, AJ, 106, 272. VLA at 1.37 and 1.67 GHz (24"), including polarization.  
 Moffett *et al.* 1993, AJ, 106, 1566. VLA at 1.37 and 1.67 GHz (10"  $\times$  14"), for proper motion studies.  
 Raymond *et al.* 1995, ApJ, 454, L31. Far UV spectroscopy.  
 Koyama *et al.* 1995, Natur, 378, 255. ASCA observations.  
 Willingale *et al.* 1996, MNRAS, 278, 749. ROSAT observations.  
 Blair *et al.* 1996, ApJ, 468, 871. Optical absorption studies.  
 Laming *et al.* 1996, ApJ, 472, 267. Modelling of optical spectra, including distance.  
 Wu *et al.* 1997, ApJ, 477, L53. Far UV absorption spectra of the Schweizer-Middleditch star.  
 Winkler & Long 1997, ApJ, 486, L137. UV absorption spectra of background quasar.  
 Tanimori *et al.* 1998, ApJ, 497, L25.  $\gamma$ -ray detection.

**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, AuJPA, 14, 133. Molonglo at 408 MHz (3') and Parkes 64-m at 5 GHz (4').  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50").  
 Wilson 1986, ApJ, 302, 718. Lack of detection with IPC.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43"  $\times$  54" :  $S = 15$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G329.7+0.4****RA:** 15<sup>h</sup>57<sup>m</sup>30<sup>s</sup>**1-GHz flux/Jy:** >34?**Size/arcmin:** 40  $\times$  33**Dec:** –52°11′**Spectral index:** ?**Type:** S

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

**References:**

- Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43"  $\times$  53" :  $S > 38$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G330.0+15.0****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?

Lupus Loop

**Size/arcmin:** 180?**Type:** S**Radio:** Low surface brightness loop with HI shell.**X-ray:** Detected.**References:**

Milne 1971, AuJPh, 24, 757. Parkes 64-m at 408 MHz (48′), 635 MHz (31′) and 1410 MHz (15′).  
 Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz (8′.4:  $S=120\pm 30\%$ ).  
 Toor 1980, A&A, 85, 184. X-ray image and spectrum.  
 Colomb & Dubner 1982, A&A, 112, 141. Argentine 30-m dish at 1.42 GHz (30′), HI observations.  
 Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.  
 Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.

**G330.2+1.0****RA:** 15<sup>h</sup>57<sup>m</sup>20<sup>s</sup>**Dec:** –51°26′**1-GHz flux/Jy:** 5?**Spectral index:** 0.3**Size/arcmin:** 11**Type:** S?**Radio:** Clumpy non-thermal emission, possibly a distorted shell.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′:  $S=8.6$ ) and Parkes 64-m at 5 GHz (4′:  $S=4.0$ ).  
 Caswell *et al.* 1983, MNRAS, 204, 915. FIRST at 1415 MHz (52″ × 47″), and MOST at 843 MHz (43″ × 55″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 55″:  $S=4.7$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G332.0+0.2****RA:** 16<sup>h</sup>09<sup>m</sup>30<sup>s</sup>**Dec:** –50°45′**1-GHz flux/Jy:** 8?**Spectral index:** 0.5**Size/arcmin:** 12**Type:** S**Radio:** Incomplete shell.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 57″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 55″:  $S=8.9$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G332.4–0.4****RA:** 16<sup>h</sup>13<sup>m</sup>45<sup>s</sup>**Dec:** –50°55′**1-GHz flux/Jy:** 28**Spectral index:** 0.5

RCW 103

**Size/arcmin:** 10**Type:** S**Radio:** Shell, brightest to the S.**Optical:** Filaments correspond well to the radio shell.**X-ray:** Detected, with point source near centre.**Point sources:** Central X-ray source, and nearby pulsar.**Distance:** HI absorption indicates 3.3 kpc.**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Tuohy & Garmire 1980, ApJ, 239, L107. HRI detection of X-ray point source.  
 Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50″).  
 Lamb & Markert 1981, ApJ, 244, 94. IPC observations.  
 Ruiz 1983, AJ, 88, 1210. Optical spectra.  
 Tuohy *et al.* 1983, ApJ, 268, 778. X-ray observations.  
 Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.  
 Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum (and HRI image from Tuohy, private communication).  
 Meaburn & Allen 1986, MNRAS, 222, 593. Optical spectra.  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 57″).  
 Oliva *et al.* 1990, A&A, 240, 453. IR spectroscopy.  
 Dickel *et al.* 1996, AJ, 111, 340. ATCA at 1.36 (8″) and 2.37 GHz (4″.5″), including polarization.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 55″:  $S=34$ ).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.  
 Gotthelf *et al.* 1997, ApJ, 487, L175. ASCA observations of compact X-ray source.  
 Torii *et al.* 1998, ApJ, 494, L207. ASCA detection of nearby pulsar.  
 Kaspi *et al.* 1998, ApJ, 503, L161. Pulsar observations.

**G332.4+0.1**

**RA:** 16<sup>h</sup>11<sup>m</sup>30<sup>s</sup>  
**Dec:** –50°35′

**1-GHz flux/Jy:** 26  
**Spectral index:** 0.5

MSH 16–51, Kes 32

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

Has been called G332.4+0.2.

**Radio:** Distorted shell, with thermal jet and plume adjacent.

**Point sources:** Pulsar nearby.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Roger *et al.* 1985, Natur, 316, 44. MOST at 843 MHz (44″ × 57″).  
 Caraveo 1993, ApJ, 415, L111. Nearby pulsar.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 56″ : S=29).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G335.2+0.1**

**RA:** 16<sup>h</sup>24<sup>m</sup>00<sup>s</sup>  
**Dec:** –48°40′

**1-GHz flux/Jy:** 16  
**Spectral index:** 0.5

**Size/arcmin:** 21  
**Type:** S

**Radio:** Well defined shell.

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

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S=27.1) and Parkes 64-m at 5 GHz (4′ : S=8.6).  
 Kaspi *et al.* 1996, AJ, 111, 2028. Pulsar observations.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 57″ : S=16).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G336.7+0.5**

**RA:** 16<sup>h</sup>28<sup>m</sup>30<sup>s</sup>  
**Dec:** –47°13′

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

**Size/arcmin:** 14 × 10  
**Type:** S

**Radio:** Irregular shell.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 60″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ : S=6.1).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G337.0–0.1**

**RA:** 16<sup>h</sup>32<sup>m</sup>15<sup>s</sup>  
**Dec:** –47°30′

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

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

(CTB 33)

This entry refers to a small (1′.5) SNR, not the larger previously catalogued G337.0–0.1.

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

**Distance:** Association with CRB 33 gives 11 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ : S=21).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Sarma *et al.* 1997, ApJ, 483, 335. ATCA at 1.4 GHz (12″) including HI, and 8.9 GHz (13″ × 15″) for recombination lines, clarifying extent of the remnant.

**G337.2–0.7**

**RA:** 16<sup>h</sup>35<sup>m</sup>45<sup>s</sup>  
**Dec:** –47°45′

**1-GHz flux/Jy:** 2?  
**Spectral index:** 0.7

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

**Radio:** Shell, not well resolved.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : S=3.8) and Parkes 64-m at 5 GHz (4′ : S=0.70).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 58″ : S=2.0).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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<b>G337.3+1.0</b>			Kes 40
<b>RA:</b> 16 <sup>h</sup> 29 <sup>m</sup> 00 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 16	<b>Size/arcmin:</b> 15 × 12	
<b>Dec:</b> –46°30′	<b>Spectral index:</b> 0.55	<b>Type:</b> S	

**Radio:** Nearly complete shell.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S=24.6$ ) and Parkes 64-m at 5 GHz (4′ :  $S=7.2$ ).  
 Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).  
 Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 61″).  
 Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz (43″ × 59″ :  $S=14.8 \pm 3.0$ ), and Parkes 64-m at 8.4 GHz (3′ :  $S=5.1 \pm 0.6$ ), including polarization.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S=20$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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<b>G337.8 – 0.1</b>			Kes 41
<b>RA:</b> 16 <sup>h</sup> 35 <sup>m</sup> 20 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 18	<b>Size/arcmin:</b> 9 × 6	
<b>Dec:</b> –46°53′	<b>Spectral index:</b> 0.5	<b>Type:</b> S	

**Radio:** Distorted shell.

**Distance:** HI absorption suggests > 9.3 kpc.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S=18$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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<b>G338.1+0.4</b>			
<b>RA:</b> 16 <sup>h</sup> 34 <sup>m</sup> 20 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 4?	<b>Size/arcmin:</b> 15?	
<b>Dec:</b> –46°18′	<b>Spectral index:</b> 0.4	<b>Type:</b> S	

**Radio:** Arc in NE, merging with thermal emission in S.

**Optical:** Detected.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical detection.  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S=3.8$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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

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

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S=7.4$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

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<b>G338.5+0.1</b>			
<b>RA:</b> 16 <sup>h</sup> 37 <sup>m</sup> 30 <sup>s</sup>	<b>1-GHz flux/Jy:</b> 12?	<b>Size/arcmin:</b> 9	
<b>Dec:</b> –46°13′	<b>Spectral index:</b> ?	<b>Type:</b> ?	

**Radio:** Circle of non-thermal emission in complex region, not well defined.

**References:**

Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 59″ :  $S=13$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G340.4+0.4**

**RA:** 16<sup>h</sup>42<sup>m</sup>55<sup>s</sup>  
**Dec:** –44°34′

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

**Size/arcmin:** 10 × 7  
**Type:** S

**Radio:** Distorted shell, elongated east–west.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=8.2$ ) and Parkes 64-m at 5 GHz (4′ :  $S=2.9$ ).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50″).  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz (75″ × 48″ :  $S=9.8\pm 0.9$ ) and 1.4 GHz (27″ × 9″ :  $S=3.6\pm 0.1$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 61″ :  $S=5.9$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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?  
**Spectral index:** 0.4?

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

**Radio:** Incomplete shell.

**Optical:** Possible associated filaments.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=7.0$ ) and Parkes 64-m at 5 GHz (4′ :  $S=2.8$ ).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50″).  
 Zealey *et al.* 1979, A&AS, 38, 39. Optical.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz (75″ × 48″ :  $S=9.2\pm 0.9$ ) and 1.4 GHz (27″ × 9″ :  $S=5.8\pm 0.1$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 61″ :  $S=4.5$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G341.2+0.9**

**RA:** 16<sup>h</sup>44<sup>m</sup>00<sup>s</sup>  
**Dec:** –43°42′

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

**Size/arcmin:** 16 × 22  
**Type:** C?

**Radio:** Incomplete shell, with extension to SW.

**Point sources:** Pulsar in W.

**References:**

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

**G341.9–0.3**

**RA:** 16<sup>h</sup>51<sup>m</sup>25<sup>s</sup>  
**Dec:** –43°56′

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

**Size/arcmin:** 7  
**Type:** S

**Radio:** Incomplete shell, brightest to NE.

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ :  $S=7.4$ ) and Parkes 64-m at 5 GHz (4′ :  $S=1.7$ ), see Caswell & Clark 1975, AuJPA, 37, 57 for the maps.  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50″), revision of previous flux densities.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (35″ × 11″ :  $S=2.2\pm 0.1$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″ :  $S=2.7$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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:** 12 × 9  
**Type:** S

**Radio:** Distorted shell.

**References:**

Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz (50″), estimate  $S(408)=5$ ,  $S(5000)=2$  from previous maps.  
 Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (35″ × 11″).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 62″ :  $S=3.5$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G342.1 + 0.9****RA:** 16<sup>h</sup>47<sup>m</sup>10<sup>s</sup>**Dec:** –42°59′**1-GHz flux/Jy:** 0.5?**Spectral index:** ?**Size/arcmin:** 10 × 9**Type:** S**Radio:** Incomplete shell.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 63″ :  $S=0.6$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G343.1 – 2.3****RA:** 17<sup>h</sup>04<sup>m</sup>25<sup>s</sup>**Dec:** –44°12′**1-GHz flux/Jy:** 8?**Spectral index:** 0.5?**Size/arcmin:** 32?**Type:** C?**Radio:** Incomplete shell?**Point sources:** Pulsar near edge.**References:**

McAdam *et al.* 1993, Natur, 361, 516. MOST at 843 MHz (smoothed to 2′).  
 Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz (56″ × 111″ :  $S=10.6$ ) and 1.4 GHz (22″ × 27″) near pulsar.  
 Becker *et al.* 1995, A&A, 298, 528. ROSAT of pulsar, and limit for remnant.

**G343.1 – 0.7****RA:** 16<sup>h</sup>56<sup>m</sup>50<sup>s</sup>**Dec:** –43°10′**1-GHz flux/Jy:** 7.8**Spectral index:** 0.55**Size/arcmin:** 27 × 21**Type:** S**Radio:** Shell, with smaller thermal shell adjacent.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 63″ :  $S=8.5 \pm 0.6$ ), plus Parkes 64-m at 4.5 GHz ( $S=3.9 \pm 0.6$ ) and 8.55 GHz ( $S=2.4 \pm 0.5$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G344.7 – 0.1****RA:** 17<sup>h</sup>00<sup>m</sup>20<sup>s</sup>**Dec:** –41°38′**1-GHz flux/Jy:** 2.5?**Spectral index:** 0.5**Size/arcmin:** 10**Type:** C?**Radio:** Aysmmetric shell, with possible core.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=4.7$ ) and Parkes 64-m at 5 GHz (4′ :  $S=1.3$ ).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (30″ × 43″ :  $S=1.7 \pm 0.1$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 65″ :  $S=2.5$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G345.7 – 0.2****RA:** 17<sup>h</sup>03<sup>m</sup>50<sup>s</sup>**Dec:** –40°49′**1-GHz flux/Jy:** 0.6?**Spectral index:** ?**Size/arcmin:** 6**Type:** S**Radio:** Poorly defined diffuse shell.**Point sources:** Old pulsar nearby.**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 66″ :  $S=0.7$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G346.6 – 0.2****RA:** 17<sup>h</sup>06<sup>m</sup>50<sup>s</sup>**Dec:** –40°07′**1-GHz flux/Jy:** 8?**Spectral index:** 0.5?**Size/arcmin:** 8**Type:** S**Radio:** Irregular shell.**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ :  $S=14.9$ ) and Parkes 64-m at 5 GHz (4′ :  $S=4.3$ ).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (31″ × 43″ :  $S=8.1 \pm 0.9$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 67″ :  $S=8.7$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.



**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).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 69'': S=10.2).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**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

**CTB 37A**  
**Size/arcmin:** 15  
**Type:** S

**Radio:** Shell, poorly define to S and W, overlapping G348.5–0.0 in E.

**Distance:** HI absorption indicates 10.2±3.5 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3': S=97).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4'.4: S=43).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz (0'.8: S>50) and Parkes 64-m at 14.7 GHz (2'.2: S=18±5).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20'' × 45'').  
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46'' × 53''), 1.4 GHz (18'' × 33'') and part at 5 GHz (2''.5 × 3''.9).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 69'': S=71).

**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

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

**Radio:** Incomplete shell with faint eastern extensions.

**Distance:** HI absorption indicates 10.2±3.5 kpc.

**References:**

Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz (3': S=34).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4'.4: S=32).  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Milne *et al.* 1979, MNRAS, 188, 437. FIRST at 1415 MHz (0'.8: S>20) and Parkes 64-m at 14.7 GHz (2'.2: S=8±3).  
 Downes 1984, MNRAS, 210, 845. VLA at 1465 MHz (20'' × 45'').  
 Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz (46'' × 53'').  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 69'': S=33).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**G349.2 – 0.1**

**RA:** 17<sup>h</sup>13<sup>m</sup>50<sup>s</sup>  
**Dec:** –38°01′

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

**Size/arcmin:** 9 × 6  
**Type:** S

**Radio:** Elongated shell, adjacent to bright HII region.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 70'': S=1.6).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

**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, AuJPA, 37, 39. Molonglo at 408 MHz (3': S=31.0) and Parkes 64-m at 5 GHz (4': S=9.1), no maps.  
 Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.  
 Shaver *et al.* 1985, Natur, 313, 113. VLA at 1.4 GHz (3''.4 × 14''.5).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43'' × 71'': S=22).  
 Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.

**G350.0 – 2.0**

**RA:** 17<sup>h</sup>24<sup>m</sup>20<sup>s</sup>  
**Dec:** –38°30′

**1-GHz flux/Jy:** 26  
**Spectral index:** 0.4

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

Incorporates the previously catalogued G350.0–1.8 in the NW.

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

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ( $3' : S=49.5$ ) and Parkes 64-m at 5 GHz ( $4' : S=13.6$ ).  
 Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz ( $4'.4$ ).  
 Gaensler 1998, ApJ, 493, 781. VLA and Parkes 64-m at 1.4 GHz ( $18'' \times 21'' : S=22.3 \pm 0.3$ ), clarifying extent of remnant.

**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?  
**Spectral index:** 0.4

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

Has been called G351.3+0.2.

**Radio:** Distorted shell, with possible flat-spectrum core.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ( $3' : S=8.1$ ) and Parkes 64-m at 5 GHz ( $4' : S=3.1$ ).  
 Caswell *et al.* 1984, PASAu, 5, 227. MOST at 843 MHz ( $43'' \times 77''$ ).  
 Becker & Helfand 1988, AJ, 95, 883. VLA at 5 GHz ( $15''$ ), and at 15 GHz of core.  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ( $32'' \times 36'' : S=4.8 \pm 0.2$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 73'' : S=5.5$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.

**G351.7+0.8**

**RA:** 17<sup>h</sup>17<sup>m</sup>40<sup>s</sup>  
**Dec:** –35°24′

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

**Size/arcmin:** 18 × 14  
**Type:** S

**Radio:** Elongated shell, adjacent to bright HII region.

**Point sources:** Pulsar nearby.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 74'' : S=11$ ).

**G351.9 – 0.9**

**RA:** 17<sup>h</sup>25<sup>m</sup>30<sup>s</sup>  
**Dec:** –36°14′

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

**Size/arcmin:** 12 × 9  
**Type:** S

**Radio:** Asymmetric shell.

**References:**

Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 73'' : S=2.0$ ).

**G352.7 – 0.1**

**RA:** 17<sup>h</sup>24<sup>m</sup>20<sup>s</sup>  
**Dec:** –35°05′

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

**Size/arcmin:** 8 × 6  
**Type:** S

**Radio:** Distorted shell.

**X-ray:** Detected.

**References:**

Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ( $3' : S=9.6$ ) and Parkes 64-m at 5 GHz ( $4' : S=2.3$ ).  
 Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz ( $1'.1$ ).  
 Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ( $34'' : S=3.4 \pm 0.4$ ).  
 Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ( $43'' \times 75'' : S=4.4$ ).  
 Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.  
 Kinugasa *et al.* 1998, PASJ, 50, 249. ASCA observations.

**G354.1+0.1****RA:** 17<sup>h</sup>27<sup>m</sup>10<sup>s</sup>**Dec:** –33°44′**1-GHz flux/Jy:** ?  
**Spectral index:** varies?**Size/arcmin:** 15 × 3?**Type:** C?

Is this a SNR?

**Radio:** Elongated N–S.**Point sources:** Pulsar at S tip.**References:**Frail *et al.* 1994, ApJ, 437, 781. VLA at 330 MHz (47'' × 99'') and 1.4 GHz (8''.8 × 21'').**G354.8 – 0.8****RA:** 17<sup>h</sup>32<sup>m</sup>40<sup>s</sup>**Dec:** –33°40′**1-GHz flux/Jy:** 2.8?**Spectral index:** ?**Size/arcmin:** 19**Type:** S**Radio:** Distorted shell.**References:**

Whiteoak &amp; Green 1996, A&amp;AS, 118, 329. MOST at 843 MHz (43'' × 78'' : S=3.1).

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**G355.6 – 0.0****RA:** 17<sup>h</sup>32<sup>m</sup>00<sup>s</sup>**Dec:** –32°36′**1-GHz flux/Jy:** 3?**Spectral index:** ?**Size/arcmin:** 6 × 8**Type:** S**Radio:** Well defined shell.**References:**

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

**G355.9 – 2.5****RA:** 17<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, brightest to SE.**References:**Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3' : S=12.3) and Parkes 64-m at 5 GHz (4' : S=3.4).Caswell *et al.* 1984, PASAu, 5, 227. MOST at 843 MHz (43'' × 77'').Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz (32'' × 34'' : S=5.0 ± 0.3).

Gray 1994, MNRAS, 270, 836. MOST at 843 MHz (43'' × 77'').

Green *et al.* 1997, AJ, 114, 2058. Parkes 64-m OH observations.**G356.3 – 0.3****RA:** 17<sup>h</sup>34<sup>m</sup>40<sup>s</sup>**Dec:** –32°14′**1-GHz flux/Jy:** 3?**Spectral index:** ?**Size/arcmin:** 7 × 11**Type:** S**Radio:** Elongated shell, brighter in N.**References:**

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

**G356.3 – 1.5****RA:** 17<sup>h</sup>39<sup>m</sup>20<sup>s</sup>**Dec:** –32°51′**1-GHz flux/Jy:** 3?**Spectral index:** ?**Size/arcmin:** 15 × 20**Type:** S**Radio:** Double arc.**References:**

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

**G357.7 – 0.1**

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 (possibly a compact HII region).

**References:**

Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ( $3' : S=54.2$ ) and Parkes 64-m at 5 GHz ( $4' : S=18.5$ ).  
Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz ( $4'.4 : S=14.6$ ).  
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6$ ).  
Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz ( $50''$ ).  
Weiler & Panagia 1980, A&A, 90, 269. Effelsberg 100-m at 9 GHz ( $1'.5$ ) (private communication from Baker).  
Shaver *et al.* 1985, Natur, 313, 113. VLA at 1.4 GHz ( $3''.8 \times 10''.9$ ) and 5 GHz ( $12'' \times 26''$ ).  
Becker & Helfand 1985, Natur, 313, 115. VLA at 1.4 GHz and 5 GHz, suggest it is not a SNR, see Helfand & Becker 1985 Natur, 313, 118.  
Shaver *et al.* 1985, A&A, 147, L23. Observations of peripheral compact source.  
Caswell *et al.* 1989, PASAu, 8, 184. MOST at 843 MHz ( $43'' \times 83''$ ).  
Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ( $43'' \times 84''$ ).  
Stewart *et al.* 1994, ApJ, 432, L39. ATCA at 4.79 and 5.84 GHz ( $12'' \times 22''$ ) and Effelsberg 100-m at 10.6 GHz ( $1'$ ), including polarization.  
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including masers.

**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, A&AS, 57, 165. Effelsberg 100-m at 2.7 GHz ( $4'.3 : S=7 \pm 1.5$ ),  $S(5000)=5.5 \pm 1.5$  from surveys.  
Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ( $43'' \times 84''$ ).

**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, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz ( $4'.3$ ).  
Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ( $43'' \times 86''$ ).

**G359.1 – 0.5****RA:** 17<sup>h</sup>42<sup>m</sup>20<sup>s</sup>  
**Dec:** –29°56′**1-GHz flux/Jy:** 14  
**Spectral index:** 0.4?**Size/arcmin:** 24  
**Type:** S

**Radio:** Non-thermal shell in complex region, crossed by the ‘snake’.

**Point sources:** Several compact radio sources near centre, OH masers around edge.

**References:**

Downes *et al.* 1979, A&AS, 35, 1. From observations by Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ( $2'.6 : S=13$ ).  
Reich & Fürst 1984, A&AS, 57, 165. Effelsberg 100-m at 2.7 GHz ( $4'.3 : S=10 \pm 1.5$ ) and 4.8 GHz ( $2'.4 : S=8.1 \pm 0.5$ ).  
Uchida *et al.* 1992, ApJ, 398, 128. VLA at 1.5 GHz ( $11'' \times 10''$ ), and observations of nearby molecular material.  
Uchida *et al.* 1992, AJ, 104, 1533. VLA at 1.4 GHz.  
Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ( $43'' \times 85''$ ).  
Yusef-Zadeh *et al.* 1995, Sci, 270, 1801. VLA at 1.4 GHz ( $33'' \times 31''$ ), and 1.7 GHz for OH survey.

**G359.1 + 0.9****RA:** 17<sup>h</sup>36<sup>m</sup>25<sup>s</sup>  
**Dec:** –29°09′**1-GHz flux/Jy:** 5?  
**Spectral index:** ?**Size/arcmin:** 11 × 12  
**Type:** S

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

**References:**

Gray 1994, MNRAS, 270, 847. MOST at 843 MHz ( $43'' \times 88'' : S=4.3$ ).