G0.0 + 0.0 — Sgr A East

RA: $17^h42^m33^s$ **1-GHz flux/Jy:** 100? **Size/arcmin:** 3.5 × 2.5
Dec: $-28°59'$ **Spectral index:** 0.8? **Type:** S

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

References:
Ekers *et al.* 1983, A&A, 122, 143. VLA at 1.4 GHz and 5 GHz (both $5'' \times 8''$), $S(1.4) = 77$, $S(5.0) = 31$.
Pedlar *et al.* 1989, ApJ, 342, 769. VLA at 332 MHz ($12''$), 1.4 GHz ($1''.3 \times 2''.5$) and 5 GHz ($1''.3 \times 2''.5$).
Mezger *et al.* 1989, A&A, 209, 337. Nearby molecular material.
Ho *et al.* 1991, Nat, 350, 309. VLA of NH_3 emission from surroundings.
Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz ($17'' \times 33''$).
Serabyn *et al.* 1992, ApJ, 395, 166. Nearby molecular material.
Gray 1994, MNRAS, 270, 835. MOST at 843 MHz ($43'' \times 88''$).
Yusef-Zadeh & Mehringer 1995, ApJ, 452, L37. VLA of nearby H_2O masers.

G0.9 + 0.1

RA: $17^h44^m12^s$ **1-GHz flux/Jy:** 18? **Size/arcmin:** 8
Dec: $-28°08'$ **Spectral index:** varies **Type:** C

Radio: Flat spectrum core within steep spectrum shell.

X-ray: Possibly detected.

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

G1.0 − 0.1

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

Has been called G1.05−0.1.

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

References:
Downes *et al.* 1979, A&AS, 35, 1. Review of flux densities.
Anantharamaiah *et al.* 1991, MNRAS, 249, 262. VLA at 330 MHz ($64'' \times 100'' : S = 12.3$).
Liszt 1992, ApJS, 82, 495. VLA at 1.6 GHz ($13'' \times 23''$).
Gray 1994, MNRAS, 270, 835. MOST at 843 MHz ($43'' \times 91''$).

G1.4 − 0.1

RA: $17^h46^m30^s$ **1-GHz flux/Jy:** 2? **Size/arcmin:** 10
Dec: $-27°45'$ **Spectral index:** ? **Type:** S

Radio: Shell, brightest in E.

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

G1.9 + 0.3

RA: $17^h45^m37^s$ **1-GHz flux/Jy:** 0.6 **Size/arcmin:** 1.2
Dec: $-27°09'$ **Spectral index:** 0.7 **Type:** S

Radio: Shell, brighter to the N.

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

G3.7 − 0.2

RA: $17^h52^m20^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 11 × 14
Dec: $-25°50'$ **Spectral index:** ? **Type:** S

Radio: Double arc.

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

G3.8 + 0.3

RA: $17^h49^m50^s$ **1-GHz flux/Jy:** 4? **Size/arcmin:** 18
Dec: $-25°27'$ **Spectral index:** ? **Type:** S?

Radio: Incomplete shell.

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

G4.2 − 3.5

RA: $18^h05^m45^s$ **1-GHz flux/Jy:** 3.2? **Size/arcmin:** 28
Dec: $-27°04'$ **Spectral index:** 0.6? **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 Kepler, SN1604, 3C358

RA: $17^h27^m42^s$ **1-GHz flux/Jy:** 19 **Size/arcmin:** 3
Dec: $-21°27'$ **Spectral index:** 0.64 **Type:** S

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

Radio: Incomplete shell, brighter to the N.

Optical: Faint filaments.

X-ray: Shell, brighter to the N.

Distance: Historical observations indicate about 4.4 kpc.

References:
van den Bergh & Kamper 1977, ApJ, 218, 617. Optical proper motions.
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 ($2''.5 \times 3''.2$) and 5 GHz ($3''.2 \times 4''.8$) and HRI map ($5''$).
Dickel *et al.* 1988, ApJ, 330, 254. VLA at 1.4 ($1''.2 \times 2''.3$) and 5 GHz ($0''.6 \times 1''.0$) at two epochs.
Smith *et al.* 1989, ApJ, 347, 925. EXOSAT observations.
Hatsukade *et al.* 1990, PASJ, 42, 279. X-ray spectrum.
Blair *et al.* 1991, ApJ, 366, 484. Optical imaging and spectroscopy.
Bandiera & van den Bergh 1991, ApJ, 374, 186. Optical changes.
van den Bergh 1991, PASP, 103, 194. Optical imaging.
Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.

G5.2 − 2.6

RA: $18^h04^m25^s$ **1-GHz flux/Jy:** 2.6? **Size/arcmin:** 18
Dec: $-25°45'$ **Spectral index:** 0.6? **Type:** S

Radio: Poorly resolved shell.

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

G5.4 − 1.2 Milne 56

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

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

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

Optical: Detected.

Distance: HI absorption suggests > 4.3 kpc.

Point sources: Pulsar associated with flat spectrum source.

References:
Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ($3' : S = 38$).
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz ($3'$).
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ($8'.4$) and 5 GHz ($4'.4$).
Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ($6'.8 : S = 21.9 \pm 2.4$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Zealey *et al.* 1979, A&AS, 38, 39. Optical detection.
Becker & Helfand 1985, Nat, 313, 115. VLA at 1.4 and 5 GHz. Suggest it is not SNR, see Helfand & Becker 1985, Nat, 313, 118.
Manchester *et al.* 1985, MNRAS, 212, 975. Pulsar detection.
Caswell *et al.* 1987, MNRAS, 225, 329. MOST at 843 MHz ($42'' \times 110''$).
Frail & Kulkarni 1991, Nat, 352, 785. Pulsar and remnant association.
Manchester *et al.* 1991, MNRAS, 253, 7P. Pulsar and remnant association.
Milne *et al.* 1992, MNRAS, 255, 707. Parkes 64-m at 4.75 ($4'.5 : S = 30.8 \pm 2.1$) and 8.4 GHz ($3' : S = 24 \pm 3$), including polarization.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.0 \times 4'.9 : S = 38$).
Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz ($68'' \times 73''$), plus HI absorption.

G5.9 + 3.1

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

Radio: Asymmetric shell.

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

G6.1 + 1.2

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

Has been called G6.1+1.15.

Radio: Faint, diffuse emission.

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

G6.4 − 0.1 W28

RA: $17^h57^m30^s$ **1-GHz flux/Jy:** 310 **Size/arcmin:** 42
Dec: $-23°25'$ **Spectral index:** varies **Type:** C

Has been called G6.6−0.2.

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

Optical: Filaments.

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

Point sources: Young pulsar near edge of remnant.

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

References:
Kundu & Velusamy 1972, A&A, 20, 237. NRAO 140-ft at 10 GHz (3′).
van den Bergh *et al.* 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 *et al.* 1977, ApJ, 214, 179. Some optical line ratios.
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
Andrews *et al.* 1983, ApJ, 266, 684. VLA at 1.4 GHz (8″) 4.9 GHz (3″) and 15 GHz (1″) of central region only, plus HRI image of central region.
Bohigas *et al.* 1983, RMxAA, 8, 155. Optical spectra.
Odenwald *et al.* 1984, ApJ, 279, 162. Nearby IR source.
Andrews *et al.* 1985, AJ, 90, 310. VLA of central component.
Long *et al.* 1991, ApJ, 373, 567. IPC and optical observations.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.1 × 4′.4 : $S = 660$).
Kaspi *et al.* 1993, ApJ, 409, L57. Pulsar association.
Frail *et al.* 1993, Nat, 365, 136. VLA at 327 MHz (smoothed to 65″), plus pulsar association.
Frail *et al.* 1994, ApJ, 424, L111. VLA of associated OH masers.
Esposito *et al.* 1996, ApJ, 461, 820. Possible associated gamma-ray emission.
Frail *et al.* 1996, AJ, 111, 1651. OH maser emission.

G6.4 + 4.0

RA: $17^h42^m10^s$ **1-GHz flux/Jy:** 1.3? **Size/arcmin:** 31
Dec: $-21°20'$ **Spectral index:** 0.4? **Type:** S

Radio: Faint asymmetric shell.

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

G7.7 − 3.7 1814−24

RA: $18^h14^m20^s$ **1-GHz flux/Jy:** 11 **Size/arcmin:** 22
Dec: $-24°05'$ **Spectral index:** 0.32 **Type:** S

Radio: Shell, with high polarization.

References:
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
Milne *et al.* 1986, MNRAS, 223, 487. MOST at 843 MHz (44″ × 108″) and Parkes 64-m at 8.4 GHz (3′ : $S = 4.6 \pm 0.5$), with polarization, plus review of flux densities.
Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz (70″ × 35″ : $S = 9.9 \pm 0.1$), including polarization.

G8.7 − 5.0

RA: $18^h21^m05^s$ **1-GHz flux/Jy:** 4.4 **Size/arcmin:** 26
Dec: $-23°50'$ **Spectral index:** 0.3 **Type:** S

Radio: Asymmetric shell.

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

G8.7 − 0.1 (W30)

RA: $18^h02^m35^s$ **1-GHz flux/Jy:** 80 **Size/arcmin:** 45
Dec: $-21°25'$ **Spectral index:** 0.5 **Type:** S?

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

X-ray: Northern edge detected.

Point sources: Pulsar inside western edge.

References:
Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz ($7'.2 \times 9'.7 : S = 190 \pm 50$).
Kassim & Weiler 1990, Nat, 343, 146. VLA at 327 MHz ($3'.0 \times 3'.7$).
Kassim & Weiler 1990, ApJ, 360, 184. VLA at 327 MHz ($2'.8 \times 4'.1 : S = 129 \pm 11$), and part at 1.4 GHz ($0'.9 \times 1'.8$), plus review of flux densities.
Frail *et al.* 1994, AJ, 107, 1120. VLA at 327 MHz ($37'' \times 55''$).
Finley & Ögelman 1994, ApJ, 434, L25. ROSAT observations, including pulsar.

G9.8 + 0.6

RA: $18^h02^m10^s$ **1-GHz flux/Jy:** 3.9 **Size/arcmin:** 12
Dec: $-20°14'$ **Spectral index:** 0.5 **Type:** S

Radio: Asymmetric shell.

References:
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Caswell 1983, MNRAS, 204, 833. Molonglo at 408 MHz ($3' : S = 5.8 \pm 0.6$).
Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($41'' \times 63'' : S = 3.5 \pm 0.4$).

G10.0 − 0.3

RA: $18^h05^m40^s$ **1-GHz flux/Jy:** 2.9 **Size/arcmin:** 8?
Dec: $-20°26'$ **Spectral index:** 0.8 **Type:** ?

Radio: Not well resolved.

X-ray: Detected.

Point sources: Associated with soft gamma repeater.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz ($3'$) and Parkes 64-m at 5 GHz ($4'$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Kulkarni & Frail 1993, Nat, 365, 33. VLA at 330 MHz (smoothed to $2'$) and 1.49 GHz ($40'' \times 65''$), including association with soft gamma repeater.
Sonobe *et al.* 1994, ApJ, 436, L23. X-ray observations.
Kulkarni *et al.* 1994, Nat, 368, 129. VLA at 1.4 GHz ($31''$) and 8.4 GHz ($5''.5$)
Vasisht *et al.* 1995, ApJ, 440, L65. Radio monitoring of core.
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G11.2 − 0.3

RA: $18^h08^m30^s$ **1-GHz flux/Jy:** 22 **Size/arcmin:** 4
Dec: $-19°26'$ **Spectral index:** 0.49 **Type:** C

Probably associated with the SN of AD386.

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

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

Distance: HI absorption indicates 5 kpc.

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

G11.4 − 0.1

RA: $18^h07^m50^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 8
Dec: $-19°06'$ **Spectral index:** 0.5 **Type:** S?

Radio: Incomplete shell, possibly with central core.

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

G12.0 − 0.1

RA: $18^h09^m15^s$ **1-GHz flux/Jy:** 3.5 **Size/arcmin:** 7?
Dec: $-18°38'$ **Spectral index:** 0.7 **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 ($3'.2 \times 4'.1$).
Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($41'' \times 61'' : S = 0.7$).

G13.3 − 1.3

RA: $18^h16^m30^s$ **1-GHz flux/Jy:** ? **Size/arcmin:** 70×40
Dec: $-18°01'$ **Spectral index:** ? **Type:** S?

Radio: Amporphous emission.

X-ray: Elongated emission.

Optical: Filaments in S.

Distance: Absorption indicates 2–4 kpc.

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

G13.5 + 0.2

RA: $18^h11^m20^s$ **1-GHz flux/Jy:** 3.5? **Size/arcmin:** 5×4
Dec: $-17°13'$ **Spectral index:** 1.0? **Type:** S

Has been called G13.46+0.16.

Radio: Elongated, incomplete shell.

References:
Helfand *et al.* 1989, ApJ, 341, 151. VLA at 5 GHz ($S = 0.65 \pm 0.05$) and 1.4 GHz ($15'' : S = 2.67 \pm 0.5$).

G15.1 − 1.6

RA: $18^h21^m05^s$ **1-GHz flux/Jy:** 5.5? **Size/arcmin:** 30×24
Dec: $-16°36'$ **Spectral index:** 0.8? **Type:** S

Radio: Elongated, incomplete shell.

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

G15.9 + 0.2

RA: $18^h16^m00^s$ **1-GHz flux/Jy:** 5 **Size/arcmin:** 7×5
Dec: $-15°03'$ **Spectral index:** 0.6? **Type:** S?

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

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3' : S = 7.7$) and Parkes 64-m at 5 GHz ($4' : S = 1.9$).
Angerhofer *et al.* 1977, A&A, 55, 11. NRAO 140-ft at 5 GHz ($6'.8 : S = 1.1 \pm 0.2$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1415 MHz ($58'' \times 44''$).
Dubner *et al.* 1996, AJ, 111, 1304. VLA at 330 MHz ($77'' \times 61'' : S = 11.2 \pm 1.0$), 1.4 GHz ($23'' \times 14'' : S = 3.9 \pm 0.1$) and 4.9 GHz ($13'' \times 16''$).

G16.7 + 0.1

RA: $18^h18^m05^s$ **1-GHz flux/Jy:** 3.0 **Size/arcmin:** 4
Dec: $-14°21'$ **Spectral index:** 0.6 **Type:** C

Has been called G16.73+0.08.

Radio: Asymmetric shell with flat-spectrum core.

References:
Helfand *et al.* 1989, ApJ, 341, 151. VLA at 5 GHz ($5 : S = 0.95$) and 1.4 GHz ($15'' : S = 2.43$) and OSRT at 327 MHz ($S = 5.13$).

G16.8 – 1.1

RA: $18^h22^m30^s$ **1-GHz flux/Jy:** 2? **Size/arcmin:** 30×24?
Dec: $-14°48'$ **Spectral index:** ? **Type:** ?

Radio: Overlapping thermal and non-thermal emission, parameters uncertain.

Point sources: Pulsar within boundary of non-thermal emission.

References:
Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz ($2'.4$), plus other observations.

G17.4 – 2.3

RA: $18^h28^m05^s$ **1-GHz flux/Jy:** 4.8? **Size/arcmin:** 24?
Dec: $-14°54'$ **Spectral index:** 0.8? **Type:** S

Radio: Incomplete, poorly defined shell.

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

G17.8 – 2.6

RA: $18^h30^m00^s$ **1-GHz flux/Jy:** 4.0? **Size/arcmin:** 24
Dec: $-14°41'$ **Spectral index:** 0.3? **Type:** S

Radio: Well defined shell.

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

G18.8 + 0.3 Kes 67

RA: $18^h21^m10^s$ **1-GHz flux/Jy:** 33 **Size/arcmin:** 17×11
Dec: $-12°25'$ **Spectral index:** 0.4 **Type:** S

Has been called G18.9+0.3.

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

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

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

G18.9 − 1.1

RA: $18^h27^m00^s$ **1-GHz flux/Jy:** 37 **Size/arcmin:** 33
Dec: $-13°00'$ **Spectral index:** varies **Type:** C?

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

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

X-ray: Partial shell.

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

G20.0 − 0.2

RA: $18^h25^m20^s$ **1-GHz flux/Jy:** 10 **Size/arcmin:** 10
Dec: $-11°37'$ **Spectral index:** 0.0 **Type:** F

Radio: Faint, filled-centre, polarized.

Point sources: OH source 20.1−0.1 is nearby.

References:
Becker & Helfand 1985, ApJ, 297, L25. VLA at 1.4 and 5 GHz ($12''$).
Odegard 1986, AJ, 92, 1372. TPT at 57.5 MHz ($7'.2 \times 8' : S = 8.5 \pm 2$), plus review of flux densities.

G21.5 − 0.9

RA: $18^h30^m47^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 1.2
Dec: $-10°37'$ **Spectral index:** 0.0 **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 ($6'' \times 35''$).
Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz ($20'' \times 5''$) and 8 GHz ($7'' \times 2''$), plus review of flux densities.
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Becker & Szymkowiak 1981, ApJ, 248, L23. VLA at 5 GHz ($8''$), and HRI and IPC observations.
Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT X-ray spectrum, and VLA HI observations.
Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz ($26''.5 : S = 5.64 \pm 0.29$).
Fürst *et al.* 1988, PASJ, 40, 347. NRO array at 22.3 GHz ($4''.4 \times 7''.3$).
Salter *et al.* 1989, A&A, 225, 167. Observations at 90.7 ($29''.5 : S = 3.8 \pm 0.4$) and 141.9 GHz ($S = 2.5 \pm 1.2$).
Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz ($S = 3.94 \pm 0.70$), plus review of flux densities.
Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.3 \times 3'.4 : S = 9$).
Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.

G21.8 − 0.6 Kes 69

RA: $18^h30^m00^s$ **1-GHz flux/Jy:** 69 **Size/arcmin:** 20
Dec: $-10°10'$ **Spectral index:** 0.5 **Type:** S

Radio: Incomplete shell.

X-ray: Detected.

Distance: H_2CO 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_2CO 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 et 2.7 GHz ($5' : S = 42.3 \pm 4.6$).
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ($8'.4$) and 5 GHz ($4'.4$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Seward 1990, ApJS, 73, 781. IPC observations.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.3 \times 3'.5 : S = 132$).

G22.7 − 0.2

RA: $18^h30^m30^s$ **1-GHz flux/Jy:** 33 **Size/arcmin:** 26
Dec: $-09°15'$ **Spectral index:** 0.6 **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 ($3'.3 \times 3'.4 : S = 82$).

G23.3 − 0.3 W41

RA: $18^h32^m00^s$ **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 ($3'.3 \times 3'.4 : S = 138$).
Gaensler & Johnston 1995, MNRAS, 275, L73. Possible pulsar association.

G23.6 + 0.3

RA: $18^h30^m20^s$ **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).

G24.7 − 0.6

RA: $18^h36^m00^s$ **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 ($44'' \times 56'' : S = 1.9$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G24.7 + 0.6

RA: $18^h31^m30^s$ **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.

G27.4 + 0.0 4C−04.71

RA: $18^h38^m40^s$ **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, a supposed larger remnant.

Radio: Incomplete shell.

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

Point sources: Compact X-ray source.

Distance: HI absorption indicates 6 to 7.5 kpc.

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

G27.8 + 0.6

RA: $18^h37^m06^s$ **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.

G28.8 + 1.5

RA: $18^h36^m30^s$ **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: $18^h43^m48^s$ **1-GHz flux/Jy:** 10 **Size/arcmin:** 3
Dec: $-03°02'$ **Spectral index:** 0.7 **Type:** C?

Radio: Shell with flatter spectrum emission from centre.

X-ray: Detected.

Distance: HI absorption indicates > 9 kpc and possibly at 21 kpc.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Milne & Dickel 1974, AuJPh, 27, 549. Parkes 64-m at 2.7 GHz ($8'.4 : S = 5 \pm 20\%$).
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).
Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz ($20'' \times 7''$) and 8 GHz ($25'' \times 8''$), 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 ($3'.4 \times 3'.7 : S = 27.4$).

G30.7 − 2.0

RA: $18^h51^m50^s$ **1-GHz flux/Jy:** 0.5? **Size/arcmin:** 16
Dec: $-02°58'$ **Spectral index:** 0.7? **Type:** ?

Radio: Poorly defined.

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

G30.7 + 1.0

RA: $18^h42^m10^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 24×18
Dec: $-01°35'$ **Spectral index:** 0.4 **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 ($3'.6 \times 3'.9 : S = 8.6$).

G31.5 − 0.6

RA: $18^h48^m35^s$ **1-GHz flux/Jy:** 2? **Size/arcmin:** 18?
Dec: $-01°35'$ **Spectral index:** ? **Type:** S?

Has been called G31.55−0.65.

Radio: Distorted shell? near HII region.

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

G31.9 + 0.0 — 3C391

RA: $18^h46^m50^s$ **1-GHz flux/Jy:** 24 **Size/arcmin:** 5×7
Dec: $-00°59'$ **Spectral index:** 0.55 **Type:** S

Radio: Shell, brightest in NW.

X-ray: Diffuse shell.

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

References:

Radhakrishnan *et al.* 1972, ApJS, 24, 49. HI absorption.
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).
Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15 GHz ($58'' : S > 1.6$).
Becker & Kundu 1976, ApJ, 204, 427. NRAO interferometer at 2.7 GHz ($20'' \times 23''$) and 8 GHz ($24'' \times 9''$), plus review of flux densities.
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).
Goss *et al.* 1979, A&A, 78, 75. FIRST at 1.4 GHz ($54'' \times 66'' : S = 20 \pm 2$) 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 ($3'.4 \times 3'.7 : S = 44.8$).
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 ($6''.2 \times 6''.4$), including spectral index and polarization studies.
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G32.0 − 4.9 — 3C396.1

RA: $19^h03^m00^s$ **1-GHz flux/Jy:** 22? **Size/arcmin:** 60?
Dec: $-03°00'$ **Spectral index:** 0.5? **Type:** S?

Radio: Possible large shell?

References:

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

G32.8 − 0.1 — Kes 78

RA: $18^h48^m50^s$ **1-GHz flux/Jy:** 11? **Size/arcmin:** 17
Dec: $-00°12'$ **Spectral index:** 0.2? **Type:** S?

Part has been called G33.1−0.1.

Radio: Elongated shell?

References:

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 *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ($3' : S = 12.8$) and Parkes 64-m at 5 GHz ($4' : S = 7.7$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz (2′.6).
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.6 \times 3'.8 : S = 31.3$).

G33.2 − 0.6

RA: $18^h51^m12^s$ **1-GHz flux/Jy:** 3.5 **Size/arcmin:** 18
Dec: $-00°05'$ **Spectral index:** varies **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 ($68'' \times 52'' : S = 2.7 \pm 0.3$).

G33.6 + 0.1 — Kes 79, 4C00.70, HC13

RA: $18^h50^m15^s$ **1-GHz flux/Jy:** 22 **Size/arcmin:** 10
Dec: $+00°37'$ **Spectral index:** 0.5 **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 ($1' \times 2'.9$), including HI absorption.
Velusamy *et al.* 1991, AJ, 102, 676. VLA at 327 MHz ($1'$), 1.5 ($7'' \times 14''$) and 5 GHz ($7''$), including spectral comparison.
Green & Dewdney 1992, MNRAS, 254, 686. Observations of adjacent molecular material.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.6 \times 3'.8 : S = 34.8$).
Seward & Velusamy 1995, ApJ, 439, 715. ROSAT observations.

G34.7 − 0.4 — W44, 3C392

RA: $18^h53^m30^s$ **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.

G36.6 − 0.7

RA: $18^h58^m05^s$ **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 ($3'.4 \times 3'.7 : S = 6.7$).

G36.6 + 2.6

RA: $18^h46^m20^s$ **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: $19^h01^m40^s$ **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).
Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1.4 GHz (65″ × 48″).
Becker & Helfand 1987, AJ, 94, 1629. VLA at 1.4 GHz (12″ : $S = 14$) and 5 GHz, plus IPC observations.
Patnaik *et al.* 1990, A&A, 232, 467. VLA at 1.5 GHz (25″) and 1.4 GHz (7″.8 × 7″.5) and 5 GHz (25″) including polarization, plus OSRT at 327 MHz (100″ × 31″), including review of flux densities.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz (3′.5 × 3′.6 : $S = 42.5$).
Anderson & Rudnick 1993, ApJ, 408, 514. VLA at 1.45 and 4.89 GHz for spectral index studies.

G39.7 – 2.0 W50, SS433

RA: $19^h10^m00^s$ **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 Hα and [SII].
Zealey *et al.* 1980, MNRAS, 192, 731. Optical spectra.
van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source (not SS433).
Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.
Watson *et al.* 1983, ApJ, 273, 688. X-ray observations.
Downes *et al.* 1986, MNRAS, 218, 393. Effelsberg 100-m at 4.75 GHz (2′.4 : $S = 34 \pm 4$), plus previous 1.7 and 2.7 GHz data.
Romney *et al.* 1987, ApJ, 321, 822. VLBI of SS433, including distance.
Elston & Baum 1987, AJ, 94, 1633. Mosaic with VLA at 1.4 GHz (30″) of fine structure only.
Kawai *et al.* 1989, PASJ, 41, 491. X-ray observations of SS433.
Band 1989, ApJ, 336, 937. Einstein and EXOSAT observations.
Yamauchi *et al.* 1994, PASJ, 46, L109. X-ray spectral observations.

G40.5 – 0.5

RA: $19^h04^m45^s$ **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: $19^h05^m08^s$ **1-GHz flux/Jy:** 22 **Size/arcmin:** 4.5×2.5
Dec: $+07°03'$ **Spectral index:** 0.48 **Type:** S

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

X-ray: Brighter to the E and W.

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

References:
Kundu *et al.* 1974, AJ, 79, 1332. NRAO 140-ft at 10 GHz ($3'$) and 5 GHz ($6'$).
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5' : S = 21.3 \pm 1.2$ for both components).
Caswell *et al.* 1975, A&A, 45, 239. HI absorption.
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 82 \pm 51$, also Algonquin 46-m at 10.6 GHz ($3' : S = 12 \pm 2$), and Haystack 36-m at 15.5 GHz ($2'.3 : S = 8.5 \pm 3.0$).
Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ($3' : S = 29.8$) and Parkes 64-m at 5 GHz ($4' : S = 8.7$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Caswell *et al.* 1982, MNRAS, 200, 1143. FIRST at 1.4 GHz ($58'' \times 52''$).
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.

G42.8 + 0.6

RA: $19^h04^m55^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 24
Dec: $+09°00'$ **Spectral index:** 0.5? **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 ($3'.2 \times 3'.4$).

G43.3 − 0.2 W49B

RA: $19^h08^m44^s$ **1-GHz flux/Jy:** 38 **Size/arcmin:** 4×3
Dec: $+09°01'$ **Spectral index:** 0.48 **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.

G43.9 + 1.6

RA: $19^h03^m30^s$ **1-GHz flux/Jy:** 8.6? **Size/arcmin:** 60?
Dec: $+10°25'$ **Spectral index:** 0.2? **Type:** S?

Radio: Large, poorly defined faint shell.

References:
Reich *et al.* 1988, in SNRISM, p293. Summary of parameters.
Reich *et al.* 1990, A&AS, 85, 633. Effelsberg 100-m at 2.7 GHz ($4'.3$).
Vasisht *et al.* 1994, ApJ, 431, L35. VLA at 327 MHz ($3'.2 \times 3'.4$).

G45.7 − 0.4

RA: $19^h14^m05^s$ **1-GHz flux/Jy:** 4.2? **Size/arcmin:** 22
Dec: $+11°04'$ **Spectral index:** 0.4? **Type:** S

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

References:
Fürst *et al.* 1987, A&AS, 69, 403. Effelsberg 100-m at 4.75 GHz ($2'.4 : S = 2.6 \pm 0.3$), plus other flux densities.

G46.8 − 0.3 (HC30)

RA: $19^h15^m50^s$ **1-GHz flux/Jy:** 14 **Size/arcmin:** 17×13
Dec: $+12°04'$ **Spectral index:** 0.5 **Type:** S

Has been called G46.6−0.2.

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

Distance: HI absorption suggests 6.8–8.8 kpc.

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

G49.2 − 0.7 (W51)

RA: $19^h21^m30^s$ **1-GHz flux/Jy:** 160? **Size/arcmin:** 30
Dec: $+14°00'$ **Spectral index:** 0.3? **Type:** S?

Radio: In complex region, parameters uncertain.

X-ray: Elongated east–west.

Distance: HI absorption suggests 4.1 kpc.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Parkes 64-m at 5 GHz ($4'$).
Sato 1973, PASJ, 25, 135. HI absorption.
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5'$), $S = 51.5 \pm 3.2$, for the non-thermal component, but probably confused.
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Seward 1990, ApJS, 73, 781. IPC observations.
Copetti & Schmidt 1991, MNRAS, 250, 127. CLFST at 151 MHz.
Kassim 1992, AJ, 103, 943. VLA at 327 MHz ($3'.1 \times 3'.5$).
Subrahmanyan & Goss 1995, MNRAS, 275, 755. VLA at 330 MHz ($1'.1$).
Koo *et al.* 1995, ApJ, 447, 211. ROSAT observations.
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G53.6 − 2.2 3C400.2, NRAO 611

RA: $19^h36^m30^s$ **1-GHz flux/Jy:** 8 **Size/arcmin:** 28 × 33
Dec: $+17°08'$ **Spectral index:** 0.75 **Type:** S

Has been called G53.7−2.2.

Radio: Ring of emission, with extension to NW.

Optical: Filaments and diffuse emission.

X-ray: Centrally brightened, offset to NW.

Distance: Mean optical velocity indicates 6.7 kpc.

References:
Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ($5' : S = 5.3 \pm 0.6$).
van den Bergh 1978, ApJS, 38, 119. Optical.
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5' : S = 4.8 \pm 0.3$).
Clark *et al.* 1975, AuJPA, 37, 75. Molonglo at 408 MHz ($3' : S = 11.7$).
Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 20 \pm 10$, $S(318) = 20 \pm 3.6$.
Goss *et al.* 1975, A&A, 43, 459. WSRT at 610 MHz ($1' \times 3' : S = 13.2 \pm 1.6$).
Sabbadin & d'Odorico 1976, A&A, 49, 119. Optical spectra.
Rosado 1983, RMxAA, 8, 59. Optical spectra.
Blair & Long 1988, PASP, 100, 461. Optical imaging and spectroscopy.
Long *et al.* 1991, ApJ, 373, 567. IPC and optical observations.
Winkler *et al.* 1993, ApJ, 405, 608. Optical imaging.
Dubner *et al.* 1994, AJ, 108, 207. VLA at 327 MHz ($59''$) and 1.49 GHz ($52''$), plus X-rays.
Saken *et al.* 1995, ApJ, 443, 231. ROSAT observations.

G54.1 + 0.3

RA: $19^h28^m28^s$ **1-GHz flux/Jy:** 0.5 **Size/arcmin:** 1.5
Dec: $+18°46'$ **Spectral index:** 0.1 **Type:** F?

Radio: Filled-centre.

X-ray: Detected.

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

G54.4 − 0.3 (HC40)

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

Has been called G54.5−0.3.

Radio: Shell, in complex region.

References:
Velusamy & Kundu 1974, A&A, 32, 375. NRAO 300-ft at 2.7 GHz ($5' : S = 34.4 \pm 5.0$).
Altenhoff *et al.* 1979, A&AS, 35, 23. Effelsberg 100-m at 4.9 GHz ($2'.6$).
Caswell 1985, AJ, 90, 1224. DRAO at 1.4 GHz ($1'.3 \times 2'.6 : S = 18 \pm 4$).
Velusamy *et al.* 1986, JA&A, 7, 105. WSRT at 609 MHz ($50'' \times 191''$ smoothed to $100'' \times 200''$).
Junkes *et al.* 1992, A&AS, 91, 1. Surrounding CO.
Junkes *et al.* 1992, A&A, 261, 289. Nearby IRAS sources.

G55.7 + 3.4

RA: $19^h19^m10^s$ **1-GHz flux/Jy:** 1.4 **Size/arcmin:** 23
Dec: $+21°38'$ **Spectral index:** 0.6 **Type:** S

Radio: Incomplete shell.

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

References:
Goss *et al.* 1977, A&A, 61, 93. WSRT observations at 610 MHz ($57'' \times 156'' : S = 1.9 \pm 0.2$) and 1415 MHz ($27'' \times 72'' : S = 1.0 \pm 0.1$).

G57.2 + 0.8 (4C21.53)

RA: $19^h32^m50^s$ **1-GHz flux/Jy:** 1.8? **Size/arcmin:** 12?
Dec: $+21°50'$ **Spectral index:** ? **Type:** S?

Radio: Extended non-thermal arc.

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

References:

Sieber & Seiradakis 1984, A&A, 130, 257. Effelsberg 100-m at 1.4 GHz ($8'.8 : 1.34 \pm 0.1$), 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: $19^h40^m25^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 5
Dec: $+23°28'$ **Spectral index:** ? **Type:** S

Radio: Incomplete shell.

References:

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

G59.8 + 1.2

RA: $19^h36^m50^s$ **1-GHz flux/Jy:** 1.6 **Size/arcmin:** 20×16?
Dec: $+24°12'$ **Spectral index:** 0.5 **Type:** ?

Has been called G59.7+1.2.

Radio: Poorly defined source.

References:

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

G65.1 + 0.6

RA: $19^h52^m30^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 90×50
Dec: $+28°25'$ **Spectral index:** 0.6 **Type:** S

Radio: Large, faint shell.

References:

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

G65.3 + 5.7

RA: $19^h31^m00^s$ **1-GHz flux/Jy:** 52? **Size/arcmin:** 310×240
Dec: $+31°05'$ **Spectral index:** 0.6? **Type:** S?

Has been called G65.2+5.7.

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

Optical: Strong in Hα+[NII] and [OIII].

X-ray: Detected.

Distance: Mean optical velocity suggests 0.8 kpc.

References:

Gull *et al.* 1977, ApJ, 215, L69. Optical plates.
Reich *et al.* 1979, A&A, 72, 270. Effelsberg 100-m observations at 1.42 GHz (smoothed to $11' : S = 42.4 \pm 1.6$), estimate $S(408) = 91 \pm 5$ from previous sky survey.
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
Rosado 1981, ApJ, 250, 222. Optical interferometry.
Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.
Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
Seward 1990, ApJS, 73, 781. IPC observations.

G65.7 + 1.2 DA 495

RA: $19^h50^m10^s$ **1-GHz flux/Jy:** 5.1 **Size/arcmin:** 18
Dec: $+29°18'$ **Spectral index:** 0.6 **Type:** ?

Has mistakenly been called G55.7+1.2.

Radio: Filled-centre or thick shell?

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

G67.7 + 1.8

RA: $19^h52^m34^s$ **1-GHz flux/Jy:** 1.4 **Size/arcmin:** 9
Dec: $+31°21'$ **Spectral index:** 0.3 **Type:** S

Radio: Double arc shell.

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

G68.6 − 1.2

RA: $20^h06^m40^s$ **1-GHz flux/Jy:** 0.7? **Size/arcmin:** 28 × 25?
Dec: $+30°28'$ **Spectral index:** 0.0? **Type:** ?

Radio: Faint, poorly defined source.

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

G69.0 + 2.7 CTB 80

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

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

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

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

X-ray: Diffuse emission with compact source.

Point sources: Pulsar at western edge of core.

References:
Angerhofer *et al.* 1981, A&A, 94, 313. WSRT at 610 MHz ($56'' \times 103''$) 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, JA&A, 3, 253. VLA of compact sources.
Blair *et al.* 1984, ApJ, 282, 161. Optical images and spectra.
Wang & Seward 1984, ApJ, 285, 607. IPC observations.
Strom *et al.* 1984, A&A, 139, 43. Radio observations of flat spectrum component, VLA 5 GHz ($1''.7$) and 1.4 GHz.
Mantovani *et al.* 1985, A&A, 145, 50. Bologna at 408 MHz ($2'.6 \times 4'.9 : S = 67.5 \pm 10.5$), 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, Nat, 331, 50. Pulsar detection.
Angelini *et al.* 1988, ApJ, 330, L43. EXOSAT spectra.
Fesen *et al.* 1988, Nat, 334, 229. IRAS of surrounding shell.
Whitehead *et al.* 1989, MNRAS, 237, 1109. Optical of core.
Salter *et al.* 1989, ApJ, 338, 171. NRAO 12-m at 84.2 GHz of core, plus review of flux densities.
Hester & Kulkarni 1989, ApJ, 340, 362. Optical imaging and spectroscopy.
Koo *et al.* 1990, ApJ, 364, 178. Large, expanding HI shell.
Greidanus & Strom 1990, A&A, 240, 376. Optical kinematics of core.
Koo *et al.* 1993, ApJ, 417, 196. VLA at 1.4 GHz of surrounding HI ($1'$), plus IRAS.
Safi-Harb *et al.* 1995, ApJ, 439, 722. ROSAT observations.

G69.7 + 1.0

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

Radio: Poorly resolved source.

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

G73.9 + 0.9

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

Radio: Incomplete, clumpy shell.

Optical: Weak shell.

References:
Reich *et al.* 1986, A&A, 155, 185. Effelsberg 100-m at 4.75 GHz ($2'.4 : S = 6.7 \pm 0.5$), plus other flux densities.
Chastenay & Pineault 1988, in SNRISM, p297. DRAO at 408 MHz ($3'.5 \times 5'.9$) 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, AZh, 70, 469. (See also AR, 37, 240.) Optical observations.

G74.0 − 8.5 Cygnus Loop

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

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

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

X-ray: Shell in soft X-rays.

Point sources: Several compact radio sources within the boundary of the remnant, including CL4.

References:
Keen *et al.* 1973, A&A, 28, 197. Effelsberg 100-m at 2.7 GHz (4′.8), NE at 10.7 GHz (1′.25).
Dickel & Willis 1980, A&A, 85, 55. WSRT at 610 MHz ($56'' \times 107''$) 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. [Fe X] and [Fe XIV] 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. Hα 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. Hα, [O III] 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. [Fe X] and [Fe XIV] observations.

G74.9 + 1.2 CTB 87

RA: $20^h14^m10^s$ **1-GHz flux/Jy:** 9 **Size/arcmin:** 8 × 6
Dec: +37°03′ **Spectral index:** varies **Type:** F

Radio: Filled-centre, with high polarization and high frequency turnover.

X-ray: Centrally brightened.

Distance: HI absorption indicates 12 kpc.

Point sources: Extragalactic compact source is nearby.

References:

Dickel & DeNoyer 1975, AJ, 80, 437. Arecibo $S(430) = 12.2 \pm 9.7$, $S(318) = 17.7 \pm 5.0$.
Weiler & Shaver 1978, A&A, 70, 389. WSRT at 610 MHz ($57'' \times 94'' : S = 9.1 \pm 1.2$), 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.

G76.9 + 1.0

RA: $20^h20^m30^s$ **1-GHz flux/Jy:** 2? **Size/arcmin:** 9 × 12
Dec: +38°33′ **Spectral index:** 0.6? **Type:** ?

Radio: Diffuse, non-thermal.

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.

G78.2 + 2.1 DR4, γ Cygni

RA: $20^h19^m00^s$ **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.

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, in IAU101, p281. IPC observations.
Higgs *et al.* 1983, AJ, 88, 97. CO of surroundings.
Bohigas *et al.* 1983, RMxAA, 8, 155. Optical spectra, find thermal only.
Braun & Strom 1986, A&AS, 63, 345. WSRT 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.

G82.2 + 5.3 W63

RA: $20^h17^m30^s$ **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.

G84.2 − 0.8

RA: $20^h51^m30^s$ **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:
Matthews *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 ($4'.4 : S = 6.8 \pm 1.3$).
Matthews & Shaver 1980, A&A, 87, 255. WSRT at 1415 MHz ($23'' \times 32''$), and Effelsberg 100-m at 2.7 GHz ($4'.4 : S = 5.6 \pm 0.5$).
Feldt & Green 1993, A&A, 274, 421. DRAO at 1.4 GHz ($1' \times 1'.5$), including HI, plus CO observations.

G84.9 + 0.5

RA: $20^h48^m45^s$ **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 ($S = 0.40 \pm 0.01$).

G89.0 + 4.7 HB21

RA: $20^h43^m30^s$ **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: Detected from incomplete mapping.

References:
Hirabayashi & Takahashi 1972, PASJ, 24, 231. 30-m dish at 4.2 GHz ($11' : S = 160 \pm 40$).
Willis 1973, A&A, 26, 237. NRAO 300-ft at 2.7 GHz ($5' : S = 148 \pm 16$), plus optical filaments.
Hill 1974, MNRAS, 169, 59. HMT at 1.4 GHz ($3' \times 3'.9$).
Haslam *et al.* 1975, A&A, 39, 453. Effelsberg 100-m at 2.7 GHz ($4'.4$)
Reich *et al.* 1983, in IAU101, p377. Effelsberg 100-m at 4.75 GHz ($2'.5$).
Leahy 1987, MNRAS, 228, 907. IPC observations.
Fukui & Tatematsu 1988, in SNRISM, p261. CO observations of the vicinity ($2'.7$).
Tatematsu *et al.* 1990, A&A, 237, 189. DRAO at 408 MHz ($3'.5 \times 4'.5$) and 1.4 GHz ($1'.0 \times 1'.3$), including HI, plus CO observations of adjacent molecular cloud.

G93.3 + 6.9 — DA 530, 4C(T)55.38.1

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

Has been called G93.2+6.7.

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

References:
Roger & Costain 1976, A&A, 51, 151. DRAO at 1.42 GHz ($2' \times 2'.4 : S = 6.9$).
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 $3' : S = 4.01 \pm 0.57$).

G93.7 − 0.2 — CTB 104A, DA 551

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

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

Radio: Faint shell with possible a steep spectrum core.

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

G94.0 + 1.0 — 3C434.1

RA: $21^h23^m10^s$ **1-GHz flux/Jy:** 15 **Size/arcmin:** 30×25
Dec: $+51°40'$ **Spectral index:** 0.44 **Type:** S

Radio: Incomplete shell, in complex region.

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

G109.1 − 1.0 — CTB 109

RA: $22^h59^m30^s$ **1-GHz flux/Jy:** 20 **Size/arcmin:** 28
Dec: $+58°37'$ **Spectral index:** 0.50 **Type:** S

Radio: Semicircular shell, with the Molecular cloud S152 is to the immediate W.

X-ray: Incomplete shell.

Point sources: Pulsar at W edge.

References:
Hughes *et al.* 1981, ApJ, 246, L127. WSRT at 610 MHz ($1' : S = 40 \pm 5$) shows bad CLEAN artefacts.
Blair & Kirshner 1981, Nat, 291, 132. Optical spectra.
Downes 1983, MNRAS, 203, 695. Effelsberg 100-m at 2.7 GHz ($4'.4 : S = 13.0 \pm 1.5$).
Gregory *et al.* 1983, in IAU101, p429. VLA at 1.4 GHz ($1'$), NRAO 300-ft at 5 GHz ($3'$) and IPC observations.
Sofue *et al.* 1983, PASJ, 35, 447. NRO 45-m at 10.2 GHz ($2'.7$).
Hughes *et al.* 1984, ApJ, 283, 147. WSRT at 610 MHz ($20'' : S = 26 \pm 3$) 1.4 GHz ($10''$), DRAO at 1.4 GHz ($1' \times 1'.2 : S = 16.8 \pm 2$) and Algonquin 46-m at 6.5 GHz ($4'.5 : S = 6.7 \pm 1$).
Braun & Strom 1986, A&AS, 63, 345. WSRT HI observations.
Tatematsu *et al.* 1987, PASJ, 39, 755. NRO 45-m at 10 GHz ($2'.7$), plus polarization.
Tatematsu *et al.* 1987, A&A, 184, 279. CO observations of the surroundings ($2'.7$).
Hanson *et al.* 1988, A&A, 195, 114. EXOSAT of pulsar.
Morini *et al.* 1988, ApJ, 333, 777. EXOSAT observations.
Koyama *et al.* 1989, PASJ, 41, 461. X-ray observations of pulsar.
Coe *et al.* 1989, MNRAS, 238, 649. IRAS observations of surroundings.
Green 1989, MNRAS, 238, 737. OH observations.
Tatematsu *et al.* 1990, ApJ, 351, 157. CO of surroundings, plus X-ray observations.
Davies & Coe 1991, MNRAS, 249, 313. Optical and IR observations near pulsar.
Hurford & Fesen 1995, MNRAS, 277, 549. ROSAT imaging.

G111.7 − 2.1 Cassiopeia A, 3C461

RA: $23^h21^m10^s$ **1-GHz flux/Jy:** 2720 **Size/arcmin:** 5
Dec: $+58°32'$ **Spectral index:** 0.77 **Type:** S

Presumably the remnant of a late 17th century SN.

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

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

X-ray: Incomplete shell.

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

References:

Bell *et al.* 1975, Nat, 257, 463. 5km at 5 GHz ($2'' \times 2''.3$).
Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ($58'' : S = 419.1 \pm 1.7$).
Fabian *et al.* 1980, MNRAS, 193, 175. HRI observations.
Dickel *et al.* 1982, ApJ, 257, 145. Comparison of X-ray, Radio and HRI.
Kamper & van den Bergh 1983, in IAU101, p55. Optical expansion.
Markert *et al.* 1983, ApJ, 268, 778. X-ray asymmetry.
Tuffs 1986, MNRAS, 219, 13. Proper motions from 5km maps at 5 GHz ($2'' \times 2''.3$) between 1974 and 1978.
Mezger *et al.* 1986, A&A, 167, 145. 247-GHz map ($70''$).
Tsunemi *et al.* 1986, ApJ, 306, 248. X-ray spectrum.
Fesen *et al.* 1987, ApJ, 313, 378. Optical, of fast moving flocculli.
Fesen *et al.* 1988, ApJ, 329, L89. Optical, flocculli, and "flare".
Jansen *et al.* 1988, ApJ, 331, 949. EXOSAT observations.
Woan & Duffett-Smith 1990, MNRAS, 243, 87. Structure at 81.5 MHz.
Fesen 1990, AJ, 99, 1904. [NeIII] optical imagery.
Rees 1990, MNRAS, 243, 637. Flux density decrease at 38 MHz.
Greidanus & Strom 1991, A&A, 249, 521. 20μm observations of part of shell.
Anderson *et al.* 1991, ApJ, 373, 146. VLA at 1.4 and 5 GHz ($1''.3$) for spectral variations.
Hook *et al.* 1992, A&A, 255, 285. Flux density decrease at 81.5 MHz.
Wilson *et al.* 1993, A&A, 280, 221. Molecular emission towards remnant.
Holt *et al.* 1994, PASJ, 46, L151. X-ray spectral mapping.
Woan & Duffett-Smith 1993, MNRAS, 260, 693. Deep pulsar search.
Guame *et al.* 1994, ApJ, 425, 127. NH_3 absorption and CO observations.
Iyudin *et al.* 1994, A&A, 284, L1. Gamma ray line observations.
Reed *et al.* 1995, ApJ, 440, 706. Optical spectra, for 3-d structure.
Anderson *et al.* 1995, ApJ, 441, 300. VLA at 1.4 GHz and 4.8 GHz (both $1''.3$), for polarization studies.
Anderson & Rudnick 1995, ApJ, 441, 307. VLA at 1.4 GHz and 4.8 GHz, for proper motion studies.
The *et al.* 1995, ApJ, 444, 244. Gamma ray observations.
Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.
Liszt & Lucas 1995, A&A, 294, 811. NRAO 12-m observations of molecular emission and absorption.
Lawrence *et al.* 1995, AJ, 109, 2635. Optical imaging spectroscopy.
Kassim *et al.* 1995, ApJ, 455, L59. VLA at 74 ($25''$) and 332 MHz ($6''$), including spectral index comparisons.
Anderson & Rudnick 1996, ApJ, 456, 234. VLA for spectral index comparisons.
Agafanov 1996, A&A, 306, 578. Flux density decrease at 102 MHz.

G112.0 + 1.2

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

Radio: Non-thermal source hinted by Bologna survey.

References:

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

G114.3 + 0.3

RA: $23^h34^m45^s$ **1-GHz flux/Jy:** 6? **Size/arcmin:** 90×55
Dec: $+61°38'$ **Spectral index:** 0.3? **Type:** S

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

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

Point sources: Pulsar near centre of remnant.

References:

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

G116.5 + 1.1

RA: $23^h51^m20^s$ **1-GHz flux/Jy:** 11? **Size/arcmin:** 80 × 60
Dec: +62°58′ **Spectral index:** 0.8? **Type:** S

Radio: Distinct shell, with high polarization.

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

References:

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

G116.9 + 0.2 CTB 1

RA: $23^h56^m40^s$ **1-GHz flux/Jy:** 9? **Size/arcmin:** 34
Dec: +62°10′ **Spectral index:** 0.5? **Type:** S

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

Radio: Incomplete shell.

Optical: Filaments on sky survey.

Point sources: Pulsar nearby.

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

References:

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

G117.4 + 5.0

RA: $23^h52^m30^s$ **1-GHz flux/Jy:** 30? **Size/arcmin:** 60 × 80?
Dec: +67°30′ **Spectral index:** 0.5? **Type:** S?

Radio: Non-thermal source hinted by Bologna survey.

References:

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

G119.5 + 10.2 CTA 1

RA: $00^h04^m00^s$ **1-GHz flux/Jy:** 36 **Size/arcmin:** 90?
Dec: +72°30′ **Spectral index:** 0.3 **Type:** S

Radio: Incomplete shell, poorly defined in north.

Optical: Faint diffuse nebulosities.

X-ray: Centrally brightend.

References:

Sieber *et al.* 1979, A&A, 74, 361. Effelsberg 100-m at 2.7 GHz (4′.4 : $S = 23.6 \pm 2.8$).
Sieber *et al.* 1981, A&A, 103, 393. Effelsberg 100-m at 2.7 GHz and 1.7 GHz (7′.6 : $S = 31.6 \pm 2.5$), and 6C at 151 MHz (4′ : $S = 62.6 \pm 6$).
Fesen *et al.* 1981, ApJ, 247, 148. Optical, including spectra.
Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.
Seward 1990, ApJS, 73, 781. IPC observations.
Simonetti 1992, ApJ, 386, 170. VLA observations of background sources for rotation measure studies.
Pineault *et al.* 1993, AJ, 105, 1060. DRAO at 1.4 GHz (1′ : $S = 34 \pm 4$), plus HI and IRAS.
Seward *et al.* 1995, ApJ, 453, 284. ROSAT observations.

G120.1 + 1.4 — Tycho, 3C10, SN1572

RA: $00^h22^m30^s$ **1-GHz flux/Jy:** 56 **Size/arcmin:** 8
Dec: $+63°52'$ **Spectral index:** 0.61 **Type:** S

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

Radio: Shell, brightest to the NE.

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

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

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

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

References:

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

G126.2 + 1.6

RA: $01^h18^m30^s$ **1-GHz flux/Jy:** 7 **Size/arcmin:** 70
Dec: $+64°00'$ **Spectral index:** varies **Type:** S?

Radio: Poorly defined shell.

Optical: Filaments detected.

References:

Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz ($9' : S = 6.8 \pm 0.7$) and 2.7 GHz ($4'.4 : S = 3.9 \pm 0.4$).
Blair *et al.* 1980, ApJ, 242, 592. Optical detection and spectra.
Rosado 1982, RMxAA, 5, 127. Optical spectra.
Fesen *et al.* 1983, ApJS, 51, 337. Deep [OIII] imagery.
Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz ($4'.4$) and 4.8 GHz ($2'.6$).
Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz ($3'.5 \times 3'.9 : S = 12 \pm 2.5$) and part at 1.4 GHz ($1'.1 \times 1'.0$), plus review of flux densities.
Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.

G127.1 + 0.5 R5

RA: $01^h25^m00^s$ **1-GHz flux/Jy:** 13 **Size/arcmin:** 45
Dec: $+62°55'$ **Spectral index:** 0.6 **Type:** S

Has been called G127.3+0.7.

Radio: Distinct shell, with bright central source.

Point sources: Flat radio spectrum (extragalactic) source at centre of remnant.

Optical: Detected.

Distance: 1.2–1.3 kpc if associated with NGC559.

References:

Caswell 1977, MNRAS, 181, 789. HMT at 1.42 GHz ($3'.5 \times 3'.9$), plus other observations of central source.
Salter *et al.* 1978, A&A, 66, 77. Effelsberg 100-m at 2.7 GHz ($4'.4$), plus 5 and 8.7 GHz of the central source.
Pauls 1977, A&A, 59, L13. Effelsberg 100-m at 1.4 GHz ($9' : S = 8 \pm 1$).
Reich *et al.* 1979, A&A, 78, L13. Effelsberg 100-m at 1.4 GHz ($9' : S = 10.8 \pm 1.3$).
Pauls *et al.* 1982, A&A, 112, 120. WSRT at 610 MHz ($56'' \times 62''$) and HI absorption to the point source with the VLA.
Geldzahler & Shaffer 1982, ApJ, 260, L69. Observations of central source.
Fürst *et al.* 1984, A&A, 133, 11. Effelsberg 100-m at 2.7 GHz ($4'.4$) and 4.8 GHz ($2'.6$).
Goss & van Gorkom 1984, JA&A, 5, 425. WSRT HI absorption of central source.
Joncas *et al.* 1989, A&A, 219, 303. DRAO at 408 MHz ($3'.5 \times 3'.9 : S = 17.9 \pm 2.0$) and 1.4 GHz ($1'.13 \times 1'.0 : S = 10.1 \pm 0.8$), plus review of flux densities.
Xilouris *et al.* 1993, A&A, 270, 393. Optical imaging.

G130.7 + 3.1 3C58, SN1181

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

This is the remnant of the SN of AD1181.

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

Optical: Faint filaments.

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

Point sources: Compact source in X-rays.

Distance: HI absorption indicates 3.2 kpc.

References:

Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ($58'' : S = 26.7 \pm 0.5$).
Wilson & Weiler 1976, A&A, 49, 357. WSRT at 610 MHz ($58'' \times 64''$), 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, Nat, 299, 606. HI absorption distance.
Fesen 1983, ApJ, 270, L53. Optical spectra.
Reynolds & Aller 1985, AJ, 90, 2312. VLA at 1.4 GHz ($2'$), for limits of shell.
Davelaar *et al.* 1986, ApJ, 300, L59. EXOSAT spectrum.
Green 1986, MNRAS, 218, 533. CLFST at 151 MHz ($1'.2 \times 1'.3 : S = 36 \pm 4$), 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.

G132.7 + 1.3 HB3

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

Has been called G132.4+2.2.

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

Optical: Complete, filamentary shell, shock excited spectra.

X-ray: Partial shell.

Distance: Interaction with surroundings suggests 2.2 kpc.

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

G152.2 − 1.2

RA: $04^h05^m30^s$ **1-GHz flux/Jy:** 16? **Size/arcmin:** 110?
Dec: $+48°24'$ **Spectral index:** 0.7? **Type:** S?

Radio: Non-thermal source hinted by Bologna survey.

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

G156.2 + 5.7

RA: $04^h54^m40^s$ **1-GHz flux/Jy:** 5 **Size/arcmin:** 110
Dec: $+51°47'$ **Spectral index:** 0.5 **Type:** S

Radio: Faint shell.

X-ray: Faint shell.

References:
Pfeffermann *et al.* 1991, A&A, 246, L28. ROSAT detection.
Reich *et al.* 1992, A&A, 256, 214. Effelsberg 100-m at 1.4 ($9' : S = 4.2 \pm 1.0$) and 2.7 GHz ($4'.3 : S = 3.0 \pm 1.0$), plus HI and IRAS.
Yamauchi *et al.* 1993, PASJ, 45, 795. Hard X-ray observations.

G160.9 + 2.6 HB9

RA: $04^h57^m00^s$ **1-GHz flux/Jy:** 110 **Size/arcmin:** 140 × 120
Dec: +46°36′ **Spectral index:** 0.6 **Type:** S

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

Radio: Large, filamentary shell.

Optical: Incomplete shell.

X-ray: Centrally brightened.

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

Distance: Various observations suggests less than 4 kpc.

References:

d'Odorico & Sabbadin 1977, A&AS, 28, 439. Optical spectra.
Damashek *et al.* 1978, ApJ, 225, L31. Pulsar.
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
Dwarakanath *et al.* 1982, JA&A, 3, 207. Radio observations at 34.5 MHz ($26' \times 40' : S = 750 \pm 150$), plus review of flux densities.
van Gorkom *et al.* 1982, MNRAS, 198, 757. WSRT HI absorption to nearby point source.
Seaquist & Gilmore 1982, AJ, 87, 378. VLA observations of nearby source.
Reich *et al.* 1983, in IAU101, p377. Effelsberg 100-m at 2.7 GHz (4′.5).
Krymkin *et al.* 1988, SvA, 32, 634. Observations at 12.6 and 25 MHz, plus review of flux densities.
Leahy 1988, ApJ, 322, 917. IPC observations.
Leahy & Roger, 1991, AJ, 101, 1033. DRAO at 408 MHz (3′.5 × 4′.8) and 1.4 GHz (1′.0 × 1′.4), including HI and discussion of distance.
Yamauchi & Koyama 1993, PASJ, 45, 545. Hard X-ray observations.
Leahy & Aschenbach 1995, A&A, 293, 853. ROSAT observations.

G166.0 + 4.3 VRO 42.05.01

RA: $05^h23^m00^s$ **1-GHz flux/Jy:** 7? **Size/arcmin:** 55 × 35
Dec: +42°52′ **Spectral index:** 0.4? **Type:** S

Radio: Two arcs of strikingly different radii.

Optical: Nearly complete ring.

X-ray: Predominantly in SW.

Distance: HI indicates 4.5 kpc.

References:

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

G166.2 + 2.5 OA 184

RA: $05^h15^m30^s$ **1-GHz flux/Jy:** 11 **Size/arcmin:** 90 × 70
Dec: +41°50′ **Spectral index:** 0.5 **Type:** S

Radio: Large, faint shell.

Optical: Nearly complete ring.

Distance: HI indicates 8 ± 2 kpc.

References:

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

G179.0 + 2.6

RA: $05^h50^m30^s$ **1-GHz flux/Jy:** 7 **Size/arcmin:** 70
Dec: $+31°05'$ **Spectral index:** 0.4 **Type:** S?

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

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

G180.0 – 1.7 S147

RA: $05^h36^m00^s$ **1-GHz flux/Jy:** 65 **Size/arcmin:** 180
Dec: $+27°50'$ **Spectral index:** varies **Type:** S

Radio: Large faint shell, with spectral break.

Optical: Wispy ring.

X-ray: Possible detection.

Point sources: Pulsar within boundary.

References:
van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
Sofue *et al.* 1980, PASJ, 32, 1. Effelsberg 100-m at 5 GHz (2′.6) of parts.
Kundu *et al.* 1980, A&A, 92, 225. Effelsberg 100-m at 2.7 GHz (5′.5 : $S = 34.9 \pm 4$) and 1.6 GHz (10′ : $S = 60.2 \pm 6$).
Angerhofer & Kundu 1981, AJ, 86, 1003. Arecibo at 430 MHz (9′ : $S = 97 \pm 20$).
Fürst *et al.* 1982, A&A, 115, 428. Observations of compact radio sources near the remnant.
Fesen *et al.* 1985, ApJ, 292, 29. Optical spectra.
Fürst & Reich 1986, A&A, 163, 186. Effelsberg 100-m at 1.4, 2.7 and 4.7/5.0 GHz (9′.4, 4′.3 and 2′.4/2′.6).
Sauvageot *et al.* 1990, A&A, 227, 183. EXOSAT possible detection.
Anderson *et al.* 1996, ApJ, 468, L55. Pulsar detection.

G184.6 − 5.8 — Crab Nebula, 3C144, SN1054

RA: $05^h31^m30^s$ **1-GHz flux/Jy:** 1040 **Size/arcmin:** 7×5
Dec: $+21°59'$ **Spectral index:** 0.30 **Type:** F

This is the remnant of the SN of AD1054.

Radio: Filled-centre, central pulsar, with faint "jet" (or tube) extending from the N edge.

Optical: Strongly polarized filaments, diffuse synchrotron emission, with "jet" faintly visible.

X-ray: Centrally brightened around the pulsar.

Point sources: Pulsar powering the remnant.

Distance: Proper motions and radial velocities give 2 kpc.

References:

Trimble & Woltjer 1971, ApJ, 163, L97. Optical expansion for distance.
Green *et al.* 1975, A&A, 44, 187. Effelsberg 100-m at 15.0 GHz ($58'' : S = 499.3 \pm 1.0$).
Clark *et al.* 1983, MNRAS, 204, 415. 3-D optical structure.
Velusamy 1984, Nat, 308, 251. VLA at 1.4 GHz, radio detection of "jet".
Harnden & Seward 1984, ApJ, 283, 279. X-ray observations.
Velusamy 1985, MNRAS, 212, 359. VLA at 1.4 GHz ($15''$).
Aller & Reynolds 1985, ApJ, 293, L73. Flux density decrease.
Mezger *et al.* 1986, A&A, 167, 145. 249-GHz map ($120''$).
Fesen & Gull 1986, ApJ, 306, 259. Deep [OIII] imagery of "jet".
Morsi & Reich 1987, A&AS, 69, 533. Effelsberg 100-m at 32 GHz ($26''.5 : S < 417$).
Romani *et al.* 1990, ApJ, 347, L51. HI and IR of surroundings.
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, Nat, 358, 654. IRAS observations.
Fesen & Staker 1993, MNRAS, 263, 69. [OIII] imaging of "jet", and proper motion studies.
Kassim *et al.* 1993, AJ, 106, 2218. VLA at 74 MHz ($20''$).
Véron-Cetty & Woltjer 1993, A&A, 270, 370. Continuum and [OIII] photometry.
Nolan *et al.* 1993, ApJ, 409, 697. Gamma ray observations.
Strong *et al.* 1993, A&AS, 97, 133. Gamma ray observations
Murdin 1994, MNRAS, 269, 89. Deep Hα plates and spectroscopy of halo.
Wallace *et al.* 1994, A&A, 286, 565. HI of surroundings.
MacAlpine *et al.* 1994, ApJ, 432, L131. Prominent optical knots.
Rudy *et al.* 1994, ApJ, 426, 646. IR spectroscopy.
Tanimori *et al.* 1994, ApJ, 429, L61. Gamma rays from pulsar.
Predehl & Schmitt 1995, A&A, 293, 889. ROSAT of dust scattered halo.
Lawrence *et al.* 1995, AJ, 109, 2635. Optical imaging spectroscopy.
Frail *et al.* 1995, ApJ, 454, L129. VLA at 333 MHz ($20''$) for limits on shell.
MacAlpine *et al.* 1996, ApJ, 463, 650. Optical spectroscopy of N and S rich filaments.

G189.1 + 3.0 IC443, 3C157

RA: $06^h14^m00^s$ **1-GHz flux/Jy:** 160 **Size/arcmin:** 45
Dec: $+22°36'$ **Spectral index:** 0.36 **Type:** S

Radio: Limb-brightened to NE, with faint extension to the E.

Optical: Brightest to the NE, with faint filaments outside the NE boundary.

X-ray: Shell, brightest to the NE.

Distance: Mean optical velocity suggests 0.7–1.5 kpc, association with S249 gives 1.5–2 kpc.

References:

Duin & van der Laan 1975, A&A, 40, 111. WSRT at 610 MHz ($1' \times 2'.5$), 1415 MHz ($24'' \times 63''$), and part at 5 GHz ($12'' \times 31''$).
Lozinskaya 1981, SvAL, 7, 17. Mean optical velocity.
Fesen 1984, ApJ, 281, 658. Optical of filament to far NE.
Erickson & Mahoney 1985, ApJ, 290, 596. TPT at 4 frequencies between 31 and 74 MHz ($13' \times 11'$ to $5'.4 \times 4'.7$), plus review of flux densities.
Braun & Strom 1986, A&A, 164, 193. WSRT at 327 MHz ($72'' \times 185''$) and 1.4 GHz ($17'' \times 43''$), plus HI and IRAS.
Green 1986, MNRAS, 221, 473. CLFST at 151 MHz ($1'.2 \times 3'.1$) and HMT at 1.4 GHz ($2'.1 \times 5'.4$).
Mufson *et al.* 1986, AJ, 92, 1349. Radio, IR, optical, UV and X-ray comparison, including VLA at 1.6 GHz ($3''.8 \times 3''.3$ and $40''$).
White *et al.* 1987, A&A, 173, 337. Observations of shocked molecular species.
Graham *et al.* 1987, ApJ, 313, 847. IR spectroscopy.
Burton *et al.* 1988, MNRAS, 231, 617. Molecular hydrogen imaging of shocked material.
Brown *et al.* 1988, ApJ, 334, 852. [FeX] optical imaging.
Dickel *et al.* 1989, AJ, 98, 1363. VLA at 1.4 GHz ($1''.1 \times 1''.2$) of NE.
Petre *et al.* 1988, ApJ, 335, 215. IPC, HRI, SSS and other X-ray observations.
Ziurys *et al.* 1989, ApJ, 341, 857. Observations of shocked molecular species.
Burton *et al.* 1990, ApJ, 355, 197. IR observations of shocked 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.

G192.8 − 1.1 PKS 0607+17

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

Has been called G193.3−1.5. Has been regarded as part of the 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 ($1' \times 3'.3 : S = 18 \pm 3$).

G205.5 + 0.5 — Monoceros Nebula

RA: $06^h36^m00^s$ **1-GHz flux/Jy:** 160 **Size/arcmin:** 220
Dec: $+06°30'$ **Spectral index:** 0.5 **Type:** S

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

Optical: Large ring, near Rosette nebula.

X-ray: Possibly detected.

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

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

G206.9 + 2.3 — PKS 0646+06

RA: $06^h46^m00^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 60×40
Dec: $+06°30'$ **Spectral index:** 0.5 **Type:** S?

Radio: Diffuse source near the Monoceros Nebula.

Optical: Filaments detected.

X-ray: Possibly detected.

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

G211.7 − 1.1

RA: $06^h43^m10^s$ **1-GHz flux/Jy:** 15? **Size/arcmin:** 70?
Dec: $+00°24'$ **Spectral index:** 0.5? **Type:** S?

Radio: Non-thermal source hinted by Bologna survey.

Optical: Coincides with S284, filamentary ring with brighter central area.

References:
Bonsignori-Facondi & Tomasi 1979, A&A, 77, 93. Bologna at 408 MHz ($4'.2 \times 110' : S = 23 \pm 20\%$).

G260.4 − 3.4 Puppis A, MSH 08−44

RA: $08^h20^m30^s$ **1-GHz flux/Jy:** 130 **Size/arcmin:** 60 × 50
Dec: −42°50′ **Spectral index:** 0.5 **Type:** S

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

Optical: Nebulosity and wisps.

X-ray: Brightest to the E.

Point sources: Central compact X-ray source.

Distance: Association with HI gives 2.2 ± 0.3 kpc.

References:

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

G261.9 + 5.5

RA: $09^h02^m20^s$ **1-GHz flux/Jy:** 10? **Size/arcmin:** 40 × 30
Dec: −38°30′ **Spectral index:** 0.4? **Type:** S

Radio: Faint shell with little limb brightening.

References:

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

G263.9 − 3.3 Vela (XYZ)

RA: $08^h32^m30^s$ **1-GHz flux/Jy:** 1750 **Size/arcmin:** 255
Dec: $-45°35'$ **Spectral index:** varies **Type:** C

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

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

Optical: Filaments.

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

Point sources: Pulsar within Vela X.

Distance: Vela pulsar implies 0.5 kpc.

References:

Milne 1968, AuJPh, 21, 201. Parkes 64-m at various frequencies, including 408 MHz ($48' : S = 2300 \pm 300$), 635 MHz ($31' : S = 2360 \pm 300$), 1410 MHz ($14' : S = 1640 \pm 300$) and 2650 MHz ($7'.5 : S = 1400 \pm 250$), plus discussion of the distance.
van den Bergh *et al.* 1973, ApJS, 26, 19. Optical.
Dopita *et al.* 1977, ApJ, 214, 179. Optical spectroscopy.
Hearn *et al.* 1980, ApJ, 235, L67. X-ray map.
Milne 1980, A&A, 81, 293. Maps of Vela X with Parkes 64-m at 1.66, 2.7 and 5 GHz ($12', 8'.4$ and $4'.4$).
Weiler & Panagia 1980, A&A, 90, 269. Clarify notation of this region and review previous observations.
Kahn *et al.* 1985, ApJ, 299, 821. IPC observations.
Harnden *et al.* 1985, ApJ, 299, 828. IPC and HRI observations of Vela X and pulsar.
Bignami & Caraveo 1988, ApJ, 325, L5. Pulsar proper motion from optical observations.
Dwarakanath 1991, JA&A, 12, 199. Gauribidanur 'T' array at 34.5 MHz ($26' \times 84' : S = 1800$ 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, Nat, 373, 587. ROSAT of X-ray extensions.
Strom *et al.* 1995, Nat, 373, 590. Radio of X-ray extensions.
Markwardt & Ögelman 1995, Nat, 375, 40. X-ray jet from pulsar.
Jenkins & Wallerstein 1995, ApJ, 440, 227. Optical absorption of associated neutral carbon cloud.
Milne 1995, MNRAS, 277, 1435. Parkes 64-m at 8.4 GHz ($3'$), inlcuding 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 ($43'' \times 62''$) of part.

G272.2 − 3.2

RA: $09^h05^m15^s$ **1-GHz flux/Jy:** ? **Size/arcmin:** 15?
Dec: $-51°50'$ **Spectral index:** ? **Type:** S?

Radio: Not detected (as is near Vela).

X-ray: Centrally brightened.

Optical: Detected.

References:

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

G279.0 + 1.1

RA: $09^h56^m00^s$ **1-GHz flux/Jy:** 30? **Size/arcmin:** 95
Dec: $-53°00'$ **Spectral index:** 0.6? **Type:** S

Radio: Faint, incomplete shell.

Point sources: Pulsar nearby.

References:

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

G284.3 − 1.8 MSH 10−53

RA: $10^h16^m30^s$ **1-GHz flux/Jy:** 11? **Size/arcmin:** 24?
Dec: $-58°45'$ **Spectral index:** 0.3? **Type:** S

Radio: Incomplete, poorly defined shell.

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

G286.5 − 1.2

RA: $10^h33^m50^s$ **1-GHz flux/Jy:** 1.4? **Size/arcmin:** 26×6
Dec: $-59°26'$ **Spectral index:** ? **Type:** S?

Radio: Double, elongated arc.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 50'' : S = 1.6$).

G289.7 − 0.3

RA: $10^h59^m10^s$ **1-GHz flux/Jy:** 6.2 **Size/arcmin:** 18×14
Dec: $-60°02'$ **Spectral index:** 0.2? **Type:** S

Radio: Incomplete shell.

Point sources: Compact radio source near centre.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 50'' : S = 6.4 \pm 0.5$), plus Parkes 64-m at 4.5 GHz ($S = 7.5 \pm 2.5$) and 8.55 GHz ($S = 3.6 \pm 0.9$).

G290.1 − 0.8 MSH 11−61A

RA: $11^h01^m00^s$ **1-GHz flux/Jy:** 42 **Size/arcmin:** 19×14
Dec: $-60°40'$ **Spectral index:** 0.4 **Type:** S

Radio: Elongated, clumpy shell.

Optical: Filaments detected.

X-ray: Detected.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz ($3'$) and Parkes 64-m at 5 GHz ($4'$).
Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz ($4'.4 : S = 20.2$).
Elliot & Malin 1979, MNRAS, 186, 45P. Optical image and spectra.
Kirshner & Winkler 1979, ApJ, 227, 853. Optical.
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 50''$).
Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz ($43'' \times 49'' : S = 45 \pm 11$), 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 ($43'' \times 49'' : S = 43$).

G291.0 − 0.1 (MSH 11−62)

RA: $11^h09^m45^s$ **1-GHz flux/Jy:** 16 **Size/arcmin:** 15×13
Dec: $-60°22'$ **Spectral index:** 0.29 **Type:** C?

Radio: Centrally brightened core, with surrounding arcs.

X-ray: Centrally brightened.

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

G292.0 + 1.8 MSH 11−54

RA: $11^h22^m20^s$ **1-GHz flux/Jy:** 15 **Size/arcmin:** 12×8
Dec: $-59°00'$ **Spectral index:** 0.4 **Type:** C?

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

Optical: Oxygen rich.

X-ray: Ring of emission.

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

G293.8 + 0.6

RA: $11^h32^m40^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 20
Dec: $-60°37'$ **Spectral index:** 0.6? **Type:** C

Radio: Central source, with faint extended plateau.

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3' : S = 9.0$) and Parkes 64-m at 5 GHz ($4' : S = 2.1$).
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 51''$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 49'' : S = 2.6$).

G294.1 − 0.0

RA: $11^h33^m50^s$ **1-GHz flux/Jy:** >2? **Size/arcmin:** 40
Dec: $-61°22'$ **Spectral index:** ? **Type:** S

Radio: Faint shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 49'' : S > 2$).

G296.1 − 0.5

RA: $11^h48^m40^s$ **1-GHz flux/Jy:** 8? **Size/arcmin:** 37×25
Dec: $-62°17'$ **Spectral index:** 0.6? **Type:** S

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

Radio: Irregular shell, with nearby HII regions.

Optical: Detected.

X-ray: Detected.

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

G296.5 + 10.0 PKS 1209−51/52

RA: $12^h07^m00^s$ **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: Compact X-ray source detected within the remnant.

References:
Irvine & Irvine 1974, ApJ, 192, L111. Optical.
Danziger & Dennefeld 1976, PASP, 88, 44. Optical spectra.
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
Tuohy *et al.* 1979, ApJ, 230, L27. X-ray detection with HEAO-1 A2 experiment.
Ruiz 1983, AJ, 88, 1210. Optical spectra.
Dubner *et al.* 1986, AJ, 91, 343. Argentine 30-m dish at 1.4 GHz (34′), plus HI.
Kellett *et al.* 1987, MNRAS, 225, 199. EXOSAT of the west of the remnant, including the compact source.
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 56″).
Matsui *et al.* 1988, ApJ, 329, 838. IPC and HRI observations, including compact source.
Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz (44″ × 56″).
Bignami *et al.* 1992, ApJ, 389, L67. Optical in vicinity of X-ray source.
Milne & Haynes 1994, MNRAS, 270, 106. Parkes 64-m at 2.4 GHz (8′.3 : $S = 33 \pm 3$), 4.8 GHz (4′.5 : $S = 23.3 \pm 3$) and 8.4 GHz (3′.0 : 18.8 ± 3), including polarization and review of flux densities.
Mereghetti *et al.* 1996, ApJ, 464, 842. Radio, optical and X-tray observations of central source.

G296.8 − 0.3 1156−62

RA: $11^h56^m00^s$ **1-GHz flux/Jy:** 9 **Size/arcmin:** 20 × 14
Dec: $-62°18'$ **Spectral index:** 0.6 **Type:** S

Radio: Shell, brighter to the NW.

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

G298.5 − 0.3

RA: $12^h10^m00^s$ **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: $12^h11^m00^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 12 × 9
Dec: $-62°20'$ **Spectral index:** 0.3 **Type:** S

Has been called G298.6−0.1.

Radio: Incomplete shell, in complex region.

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

G299.2 − 2.9

RA: $12^h12^m30^s$ **1-GHz flux/Jy:** 0.5? **Size/arcmin:** 18 × 11
Dec: $-65°13'$ **Spectral index:** ? **Type:** S

Radio: Faint source.

X-ray: Centrally brightened.

Optical: Filaments in W.

References:
Bussser *et al.* 1996, A&A, 310, L1. ROSAT detection, plus optical studies.

G299.6 − 0.5

RA: $12^h19^m00^s$ **1-GHz flux/Jy:** 1.0? **Size/arcmin:** 13
Dec: $-62°52'$ **Spectral index:** ? **Type:** S

Radio: Faint shell, brightest to E.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 48'' : S = 1.1$).

G301.4 − 1.0

RA: $12^h35^m00^s$ **1-GHz flux/Jy:** 2.1? **Size/arcmin:** 37 × 23
Dec: $-63°33'$ **Spectral index:** ? **Type:** S

Radio: Faint, incomplete shell, with possible extensionm to southwest.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 48'' : S = 2.3$).

G302.3 + 0.7

RA: $12^h42^m55^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 17
Dec: $-61°52'$ **Spectral index:** 0.4? **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 ($43'' \times 49'' : S = 3.2$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G304.6 + 0.1 Kes 17

RA: $13^h02^m50^s$ **1-GHz flux/Jy:** 14 **Size/arcmin:** 8
Dec: $-62°26'$ **Spectral index:** 0.5 **Type:** S

Radio: Incomplete shell.

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

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

G308.1 − 0.7

RA: $13^h34^m10^s$ **1-GHz flux/Jy:** 1.2? **Size/arcmin:** 13
Dec: $-62°49'$ **Spectral index:** ? **Type:** S

Radio: Faint shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 48'' : S = 1.3$).

G308.8 − 0.1

RA: $13^h39^m00^s$ **1-GHz flux/Jy:** 15? **Size/arcmin:** 20 × 30?
Dec: −62°08′ **Spectral index:** 0.4? **Type:** C?

Incorporates previous catalogued remnant G308.7+0.0.

Radio: Bright ridge in north, and arc to south.

Point sources: Pulsar near centre of remnant.

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 16.7$) and Parkes 64-m at 5 GHz (4′ : $S = 7.0$).
Milne & Dickel 1975, AuJPh, 28, 209. Parkes 64-m at 5 GHz (4′.4 : $S = 6.5$).
Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50″).
Wilson 1986, ApJ, 302, 718. Lack of detection with IPC.
Caswell *et al.* 1992, ApJ, 399, L151. MOST at 843 MHz (43″ × 49″).
Kaspi *et al.* 1992, ApJ, 399, L155. Pulsar observations.

G309.2 − 0.6

RA: $13^h43^m00^s$ **1-GHz flux/Jy:** 7? **Size/arcmin:** 15 × 12
Dec: −62°39′ **Spectral index:** 0.4? **Type:** S

Has been called G309.2−0.7.

Radio: Distorted shell.

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 10.0$) and Parkes 64-m at 5 GHz (4′ : $S = 3.9$).
Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (1′.5).
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz (44″ × 50″).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 48″ : $S = 6$).

G309.8 + 0.0

RA: $13^h47^m00^s$ **1-GHz flux/Jy:** 17 **Size/arcmin:** 25 × 19
Dec: −61°50′ **Spectral index:** 0.5 **Type:** S

Radio: Distorted shell.

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

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz (3′ : $S = 26.4$) and Parkes 64-m at 5 GHz (4′ : $S = 7.4$).
Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (1′).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 49″ : $S > 8.8$).

G310.6 − 0.3 Kes 20B

RA: $14^h01^m40^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 8
Dec: −62°23′ **Spectral index:** ? **Type:** S

Radio: Asymmetric shell.

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

G310.8 − 0.4 Kes 20A

RA: $14^h03^m40^s$ **1-GHz flux/Jy:** 6? **Size/arcmin:** 12
Dec: −62°31′ **Spectral index:** ? **Type:** S

Radio: Arc in E, in complex region.

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

G311.5 − 0.3

RA: $14^h02^m00^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 5
Dec: $-61°44'$ **Spectral index:** 0.5 **Type:** S

Radio: Shell, not well resolved.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Caswell & Barnes 1985, MNRAS, 216, 753. Molonglo at 408 MHz (3′).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 49'' : S = 2.9$).

G312.4 − 0.4

RA: $14^h09^m20^s$ **1-GHz flux/Jy:** 45 **Size/arcmin:** 38
Dec: $-61°29'$ **Spectral index:** 0.36 **Type:** S

Radio: Irregular, incomplete shell.

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

G315.4 − 2.3 RCW 86, MSH 14−63

RA: $14^h39^m00^s$ **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 & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
Winkler 1978, ApJ, 221, 220. X-ray detection.
Leibowitz & Danziger 1983, MNRAS, 204, 273. Optical spectra.
Pisarski *et al.* 1984, ApJ, 277, 710. IPC and HRI observations
Nugent *et al.* 1984, ApJ, 284, 612. X-ray spectrum.
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 50''$).
Long & Blair 1990, ApJ, 358, L13. Balmer dominated optical filaments.
Greidanus & Strom 1990, A&A, 240, 385. IRAS observations.
Kaastra *et al.* 1992, A&A, 264, 654. Ginga X-ray spectra.
Strom 1994, MNRAS, 268, L5. Historical association
Chin & Huang 1994, Nat, 371, 398. Questioning of historical association.
Schaefer 1995, AJ, 110, 1793. Questioning of historical association.
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 48'' : S > 22$).

G315.4 − 0.3

RA: $14^h32^m10^s$ **1-GHz flux/Jy:** 8 **Size/arcmin:** 24 × 13
Dec: $-60°23'$ **Spectral index:** 0.4 **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 ($43'' \times 49'' : S = 3.1$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant.

G315.9 − 0.0

RA: $14^h42^m20^s$ **1-GHz flux/Jy:** 0.8? **Size/arcmin:** 25 × 14
Dec: −60°24′ **Spectral index:** ? **Type:** S

Has been called G315.8−0.0.

Radio: Faint, distorted shell, with steep-spectrum "jet"?

References:
Kesteven *et al.* 1987, AuJPh, 40, 855. MOST at 843 MHz (44″ × 50″).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ : $S = 0.9$).

G316.3 − 0.0 (MSH 14−57)

RA: $14^h37^m40^s$ **1-GHz flux/Jy:** 20? **Size/arcmin:** 29 × 14
Dec: −59°47′ **Spectral index:** 0.4 **Type:** S

Radio: Distorted shell, with possible "blowout".

Distance: HI absorption data suggests > 7.2 kpc.

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

G317.3 − 0.2

RA: $14^h45^m50^s$ **1-GHz flux/Jy:** 4.7? **Size/arcmin:** 11
Dec: −59°34′ **Spectral index:** ? **Type:** S

Radio: Incomplete shell.

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

G318.2 + 0.1

RA: $14^h51^m00^s$ **1-GHz flux/Jy:** >3.9? **Size/arcmin:** 40 × 35
Dec: −58°51′ **Spectral index:** ? **Type:** S

Radio: Faint shell, with central HII region.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ : $S > 4.3$).

G318.9 + 0.4

RA: $14^h54^m40^s$ **1-GHz flux/Jy:** 4? **Size/arcmin:** 30 × 14
Dec: −58°17′ **Spectral index:** 0.2? **Type:** C

May not be a SNR?

Radio: Complex arcs, with off-centre core.

References:
Whiteoak 1990, Nat, 347, 157. MOST at 843 MHz (43″ × 51″).
Whiteoak 1993, ApJ, 415, 701. MOST at 843 MHz (43″ × 51″ : $S = 4.8 \pm 0.6$), Parkes 64-m at 4.5 GHz (4′.7 : $S = 3.7 \pm 0.2$) and 8.4 GHz (2′.8 : $S = 3.0 \pm 0.4$) including polarization, and ATCA at 1.4 GHz and 4.8 GHz (11″ × 13″) of core.
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ : $S = 4.8$).

G320.4 − 1.2 MSH 15−52, RCW 89

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

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

Radio: Ragged shell.

Optical: RCW 89 is the Hα emitting region to the NW.

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

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

Distance: HI absorption indicates 4.2 kpc.

References:
Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
Dopita *et al.* 1977, ApJ, 214, 179. Optical spectra.
Caswell *et al.* 1981, MNRAS, 195, 89. FIRST at 1415 MHz (50″).
Seward & Harnden 1982, ApJ, 256, L45. X-ray of pulsar.
Manchester *et al.* 1982, ApJ, 262, L31. Radio of pulsar.
Seward *et al.* 1983, ApJ, 267, 698. X-ray, Optical and IR.
Kamper & van den Bergh, 1980, ApJ, 280, L51. Optical expansion.
Seward *et al.* 1984, ApJ, 281, 650. X-ray observations of pulsar and nebulosity.
Trussoni *et al.* 1990, A&A, 234, 403. EXOSAT observations.
Asaoka & Koyama 1990, PASJ, 42, 625. Ginga X-ray spectrum.
Arendt 1991, AJ, 101, 2160. IRAS observations, including compact source.
Milne *et al.* 1993, MNRAS, 264, 853. Parkes 64-m at 4.8 GHz (4′.5 : $S = 37 \pm 7$) and 8.4 GHz (3′.0 : $S = 24 \pm 4$) of remnant and nearby large loop, including polarization and review of flux densities.
Strom 1994, MNRAS, 268, L5. Historical association.
Chin & Huang 1994, Nat, 371, 398. Questioning of historical association.
Matz *et al.* 1994, ApJ, 434, 288. X-ray observations of pulsar.
Schaefer 1995, AJ, 110, 1793. Questioning of historical association.
Du Plessis *et al.* 1995, ApJ, 453, 746. HartRAO 26-m at 2.3, 5 and 8.5 GHz ($S = 42, 35.6, 14.5$).
Greiveldinga *et al.* 1995, ApJ, 454, 855. ROSAT observations.
Trassoni *et al.* 1996, A&A, 306, 581. ROSAT observations.
Tamura *et al.* 1996, PASJ, 48, L33. ASCA observations.
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 50″ : $S = 62$).

G320.6 − 1.6

RA: $15^h21^m50^s$ **1-GHz flux/Jy:** ? **Size/arcmin:** 60 × 30
Dec: $-59°27'$ **Spectral index:** ? **Type:** S

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

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

G321.9 − 1.1

RA: $15^h19^m50^s$ **1-GHz flux/Jy:** >3.4? **Size/arcmin:** 28
Dec: $-58°02'$ **Spectral index:** ? **Type:** S

Radio: Faint shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 51″ : $S > 3.8$).

G321.9 − 0.3

RA: $15^h16^m45^s$ **1-GHz flux/Jy:** 13 **Size/arcmin:** 31 × 23
Dec: $-57°23'$ **Spectral index:** 0.3 **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″).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 51″ : $S > 8.3$).

G322.5 − 0.1

RA: $15^h19^m30^s$ **1-GHz flux/Jy:** 1.5 **Size/arcmin:** 15
Dec: $-56°55'$ **Spectral index:** 0.4 **Type:** C

Radio: Shell with central extended source.

Point sources: PN Pe 2-8 within boundary.

References:
Whiteoak 1992, MNRAS, 256, 121. MOST at 843 MHz ($43'' \times 51'' : S = 2.0 \pm 0.3$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 51'' : S = 1.7$), plus Parks 64-m at 4.5 GHz ($= 0.89 \pm 0.13$).

G323.5 + 0.1

RA: $15^h24^m50^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 13
Dec: $-56°11'$ **Spectral index:** 0.4? **Type:** S

Radio: Distorted shell, confused with thermal emission.

Point sources: Compact, probably thermal source near centre.

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3' : S = 4.2$) and Parkes 64-m at 5 GHz ($4' : S = 1.5$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 52'' : S = 4.2$).

G326.3 − 1.8 MSH 15−*56*

RA: $15^h49^m00^s$ **1-GHz flux/Jy:** 145 **Size/arcmin:** 38
Dec: $-56°00'$ **Spectral index:** varies **Type:** C

Has been called G326.2−1.7.

Radio: Shell, with flat spectrum core.

Optical: Emission around the shell.

X-ray: Shell, with central extended emission.

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

G327.1 − 1.1

RA: $15^h50^m30^s$ **1-GHz flux/Jy:** 7? **Size/arcmin:** 18
Dec: $-55°00'$ **Spectral index:** ? **Type:** C

Radio: Shell, with off-centre core.

X-ray: Detected.

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

G327.4 + 0.4 Kes 27

RA: $15^h44^m30^s$ **1-GHz flux/Jy:** 30? **Size/arcmin:** 21
Dec: $-53°40'$ **Spectral index:** 0.6 **Type:** S

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

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

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

References:
Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ($3' : S = 58$) 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 ($43'' \times 53'' : S = 25$).

G327.4 + 1.0

RA: $15^h43^m00^s$ **1-GHz flux/Jy:** 1.9? **Size/arcmin:** 14
Dec: $-53°11'$ **Spectral index:** ? **Type:** S

Radio: Asymmetric shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 54'' : S = 2.1$).

G327.6 + 14.6 SN1006, PKS 1459−41

RA: $14^h59^m35^s$ **1-GHz flux/Jy:** 19 **Size/arcmin:** 30
Dec: $-41°44'$ **Spectral index:** 0.6 **Type:** S

This is the remnant of the SN of AD1006.

Radio: Shell, with two bright arcs.

Optical: Filaments to the NW, with broad Hα component.

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

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

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

References:
van den Bergh 1976, ApJ, 208, L17. Optical.
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz ($8'.4$) and 5 GHz ($4'.4$).
Pskovskii 1978, SvA, 22, 420. Distance from historical records.
Becker *et al.* 1980, ApJ, 240, L33. SSS and other X-ray spectra.
Schweizer & Middleditch 1980, ApJ, 241, 1039. Possible stellar remnant.
Pye *et al.* 1981, MNRAS, 194, 569. IPC observations.
Caswell *et al.* 1983, MNRAS, 204, 921. FIRST at 1415 MHz ($77''$).
Reynolds & Gilmore 1986, AJ, 92, 1138. VLA at 1.37 and 1.67 GHz ($16'' \times 20''$).
Kirshner *et al.* 1987, ApJ, 315, L135. Broad Hα optical component.
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 66''$).
Fesen *et al.* 1988, ApJ, 327, 164. UV absorption spectra to the Schweizer-Middleditch star.
Roger *et al.* 1988, ApJ, 332, 940. MOST at 843 MHz ($44'' \times 66'' : S = 17.5 \pm 1.5$).
Long *et al.* 1988, ApJ, 333, 749. Optical proper motion for distance.
Jones & Pye 1989, MNRAS, 238, 567. EXOSAT observations.
Leahy *et al.* 1991, ApJ, 374, 218. HEAO-1 X-ray spectra.
Wu *et al.* 1993, ApJ, 416, 247. UV spectra.
Ozaki *et al.* 1994, PASJ, 46, 367. X-ray observations.
Reynolds & Gilmore 1993, AJ, 106, 272. VLA at 1.37 and 1.67 GHz ($24''$), including polarization.
Moffett *et al.* 1993, AJ, 106, 1566. VLA at 1.37 and 1.67 GHz ($10'' \times 14''$), for proper motion studies.
Raymond *et al.* 1995, ApJ, 454, L31. Far UV spectroscopy.
Koyama *et al.* 1995, Nat, 378, 255. ASCA observations.
Willingale *et al.* 1996, MNRAS, 278, 749. ROSAT observations.

G328.4 + 0.2 (MSH 15−57)

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

Radio: Amorphous emission.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Caswell *et al.* 1980, MNRAS, 190, 881. FIRST at 1415 MHz (50″).
Wilson 1986, ApJ, 302, 718. Lack of detection with IPC.
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 54″ : $S = 15$).

G329.7 + 0.4

RA: $15^h57^m30^s$ **1-GHz flux/Jy:** >34? **Size/arcmin:** 40 × 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″ × 53″ : $S > 38$).

G330.0 + 15.0 Lupus Loop

RA: $15^h05^m00^s$ **1-GHz flux/Jy:** 350? **Size/arcmin:** 180?
Dec: $-39°30'$ **Spectral index:** 0.5? **Type:** S

Radio: Low surface brightness loop with HI shell.

X-ray: Detected.

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

G330.2 + 1.0

RA: $15^h57^m20^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 11
Dec: $-51°26'$ **Spectral index:** 0.3 **Type:** S?

Radio: Clumpy non-thermal emission, possibly a distorted shell.

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

G332.0 + 0.2

RA: $16^h09^m30^s$ **1-GHz flux/Jy:** 8? **Size/arcmin:** 12
Dec: $-50°45'$ **Spectral index:** 0.5 **Type:** S

Radio: Incomplete shell.

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

G332.4 − 0.4 RCW 103

RA: $16^h13^m45^s$ **1-GHz flux/Jy:** 28 **Size/arcmin:** 10
Dec: $-50°55'$ **Spectral index:** 0.5 **Type:** S

Radio: Shell, brightest to the S.

Optical: Filaments correspond well to the radio shell.

X-ray: Detected, with point source near centre.

Point sources: Detected in X-rays.

Distance: HI absorption indicates 3.3 kpc.

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

G332.4 + 0.1 MSH 16−51, Kes 32

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

Has been called G332.4+0.2.

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

Point sources: Pulsar nearby.

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

G335.2 + 0.1

RA: $16^h24^m00^s$ **1-GHz flux/Jy:** 16 **Size/arcmin:** 21
Dec: $-48°40'$ **Spectral index:** 0.5 **Type:** S

Radio: Well defined shell.

Point sources: Old pulsar within remnant boundary.

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

G336.7 + 0.5

RA: $16^h28^m30^s$ **1-GHz flux/Jy:** 6 **Size/arcmin:** 14 × 10
Dec: $-47°13'$ **Spectral index:** 0.5 **Type:** S

Radio: Irregular shell.

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

G337.0 − 0.1 (CTB 33)

RA: $16^h32^m10^s$ **1-GHz flux/Jy:** 17? **Size/arcmin:** 13×7?
Dec: $-47°27'$ **Spectral index:** 0.5? **Type:** S?

Radio: Possible shell, confused by nearby thermal sources.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 58'' : S = 21$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G337.2 − 0.7

RA: $16^h35^m45^s$ **1-GHz flux/Jy:** 2? **Size/arcmin:** 6
Dec: $-47°45'$ **Spectral index:** 0.7 **Type:** S

Radio: Shell, not well resolved.

References:
Clark *et al.* 1975, AuJPA, 37, 1. Molonglo at 408 MHz ($3' : S = 3.8$) and Parkes 64-m at 5 GHz ($4' : S = 0.70$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 58'' : S = 2.0$).

G337.3 + 1.0 Kes 40

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

Radio: Nearly complete shell.

References:
Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz ($3' : S = 24.6$) and Parkes 64-m at 5 GHz ($4' : S = 7.2$).
Dickel & Milne 1976, AuJPh, 29, 435. Comparison of earlier Parkes 64-m maps at 2.7 GHz (8′.4) and 5 GHz (4′.4).
Kesteven & Caswell 1987, A&A, 183, 118. MOST at 843 MHz ($44'' \times 61''$).
Milne *et al.* 1989, PASAu, 8, 187. MOST at 843 MHz ($43'' \times 59'' : S = 14.8 \pm 3.0$), 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 ($43'' \times 59'' : S = 20$).

G337.8 − 0.1 Kes 41

RA: $16^h35^m20^s$ **1-GHz flux/Jy:** 18 **Size/arcmin:** 9×6
Dec: $-46°53'$ **Spectral index:** 0.5 **Type:** S

Radio: Distorted shell.

Distance: HI absorption suggests > 9.3 kpc.

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

G338.1 + 0.4

RA: $16^h34^m20^s$ **1-GHz flux/Jy:** 4? **Size/arcmin:** 15?
Dec: $-46°18'$ **Spectral index:** 0.4 **Type:** S

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

Optical: Detected.

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

G338.3 − 0.0

RA: $16^h37^m20^s$ **1-GHz flux/Jy:** 7? **Size/arcmin:** 8
Dec: $-46°28'$ **Spectral index:** ? **Type:** S

Radio: Irregular shell, in complex region.

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 59'' : S = 7.4$).

G338.5 + 0.1

RA: $16^h37^m30^s$ **1-GHz flux/Jy:** 12? **Size/arcmin:** 9
Dec: $-46°13'$ **Spectral index:** ? **Type:** ?

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

References:
Shaver & Goss 1970, AuJPA, 14, 133. Molonglo at 408 MHz (3′) and Parkes 64-m at 5 GHz (4′).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 59'' : S = 13$).

G340.4 + 0.4

RA: $16^h42^m55^s$ **1-GHz flux/Jy:** 5 **Size/arcmin:** 10×7
Dec: $-44°34'$ **Spectral index:** 0.4 **Type:** S

Radio: Distorted shell, elongated east–west.

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

G340.6 + 0.3

RA: $16^h44^m05^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 6
Dec: $-44°29'$ **Spectral index:** 0.4? **Type:** S

Radio: Incomplete shell.

Optical: Possible associated filaments.

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

G341.2 + 0.9

RA: $16^h44^m00^s$ **1-GHz flux/Jy:** 1.5? **Size/arcmin:** 16×22
Dec: $-43°42'$ **Spectral index:** 0.6? **Type:** C?

Radio: Incomplete shell, with extension to SW.

Point sources: Pulsar in W.

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

G341.9 − 0.3

RA: $16^h51^m25^s$ **1-GHz flux/Jy:** 2.5 **Size/arcmin:** 7
Dec: $-43°56'$ **Spectral index:** 0.5 **Type:** S

Radio: Incomplete shell, brightest to NE.

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

G342.0 − 0.2

RA: $16^h51^m15^s$ **1-GHz flux/Jy:** 3.5? **Size/arcmin:** 12×9
Dec: $-43°48'$ **Spectral index:** 0.4? **Type:** S

Radio: Distorted shell.

References:
Caswell *et al.* 1983, MNRAS, 203, 595. FIRST at 1415 MHz ($50''$), estimate $S(408) = 5$, $S(5000) = 2$ from previous maps.
Dubner *et al.* 1996, AJ, 111, 1304. VLA at 1.4 GHz ($35'' \times 11''$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 62'' : S = 3.5$).

G342.1 + 0.9

RA: $16^h47^m10^s$ **1-GHz flux/Jy:** 0.5? **Size/arcmin:** 10×9
Dec: $-42°59'$ **Spectral index:** ? **Type:** S

Radio: Incomplete shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 63'' : S = 0.6$).

G343.1 − 2.3

RA: $17^h04^m25^s$ **1-GHz flux/Jy:** 8? **Size/arcmin:** 32?
Dec: $-44°12'$ **Spectral index:** 0.5? **Type:** C?

Radio: Incomplete shell?

Point sources: Pulsar near edge.

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

G343.1 − 0.7

RA: $16^h56^m50^s$ **1-GHz flux/Jy:** 7.8 **Size/arcmin:** 27×21
Dec: $-43°10'$ **Spectral index:** 0.55 **Type:** S

Radio: Shell, with smaller thermal shell adjacent.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 63'' : S8.5 \pm 0.6$), plus Parkes 64-m at 4.5 GHz ($S = 3.9 \pm 0.6$) and 8.55 GHz ($S = 2.4 \pm 0.5$)

G344.7 − 0.1

RA: $17^h00^m20^s$ **1-GHz flux/Jy:** 2.5? **Size/arcmin:** 10
Dec: $-41°38'$ **Spectral index:** 0.5 **Type:** C?

Radio: Aysmmetric shell, with possible core.

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

G345.7 − 0.2

RA: $17^h03^m50^s$ **1-GHz flux/Jy:** 0.6? **Size/arcmin:** 6
Dec: $-40°49'$ **Spectral index:** ? **Type:** S

Radio: Poorly defined diffuse shell.

Point sources: Old pulsar nearby.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 66'' : S = 0.7$).

G346.6 − 0.2

RA: $17^h06^m50^s$ **1-GHz flux/Jy:** 8? **Size/arcmin:** 8
Dec: $-40°07'$ **Spectral index:** 0.5? **Type:** S

Radio: Irregular shell.

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

G348.5 − 0.0

RA: $17^h12^m00^s$ **1-GHz flux/Jy:** 10? **Size/arcmin:** 10?
Dec: $-38°25'$ **Spectral index:** 0.4? **Type:** S?

Radio: Arc, overlapping G348.5+0.1.

References:
Kassim *et al.* 1991, ApJ, 374, 212. VLA at 333 MHz ($46'' \times 53''$), 1.4 GHz ($18'' \times 33''$) and part at 5 GHz ($2''.5 \times 3''.9$).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 69'' : S = 10.2$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G348.5 + 0.1 CTB 37A

RA: $17^h10^m40^s$ **1-GHz flux/Jy:** 72 **Size/arcmin:** 15
Dec: $-38°29'$ **Spectral index:** 0.3 **Type:** S

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

Distance: HI absorption indicates 10.2±3.5 kpc.

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

G348.7 + 0.3 CTB 37B

RA: $17^h10^m30^s$ **1-GHz flux/Jy:** 26 **Size/arcmin:** 17?
Dec: $-38°08'$ **Spectral index:** 0.3 **Type:** S

Radio: Incomplete shell with faint eastern extensions.

Distance: HI absorption indicates 10.2±3.5 kpc.

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

G349.2 − 0.1

RA: $17^h13^m50^s$ **1-GHz flux/Jy:** 1.4? **Size/arcmin:** 9 × 6
Dec: $-38°01'$ **Spectral index:** ? **Type:** S

Radio: Elongated shell, adjacent to bright HII region.

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

G349.7 + 0.2

RA: $17^h14^m35^s$ **1-GHz flux/Jy:** 20 **Size/arcmin:** 2.5 × 2
Dec: $-37°23'$ **Spectral index:** 0.5 **Type:** S

Radio: Incomplete clumpy shell, with enhancement to the S.

Distance: HI absorption indicates 18.3±4.6 kpc.

References:
Becker & Kundu 1975, AJ, 80, 679. NRAO 140-ft at 10.6 GHz (3′).
Caswell *et al.* 1975, AuJPA, 37, 39. Molonglo at 408 MHz (3′ : $S = 31.0$) and Parkes 64-m at 5 GHz (4′ : $S = 9.1$), no maps.
Caswell *et al.* 1975, A&A, 45, 239. Parkes HI absorption.
Shaver *et al.* 1985, Nat, 313, 113. VLA at 1.4 GHz (3″.4 × 14″.5).
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 71″ : $S = 22$).
Frail *et al.* 1996, AJ, 111, 1651. OH emission near remnant, including compact sources (masers).

G350.0 − 1.8

RA: $17^h23^m40^s$ **1-GHz flux/Jy:** 31 **Size/arcmin:** 30?
Dec: $-38°20'$ **Spectral index:** 0.5 **Type:** S?

Radio: Arc, possibly part of a larger remnant.

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

G351.2 + 0.1

RA: $17^h19^m05^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 7
Dec: $-36°08'$ **Spectral index:** 0.4 **Type:** C?

Has been called G351.3+0.2.

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

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

G351.7 + 0.8

RA: $17^h17^m40^s$ **1-GHz flux/Jy:** 10? **Size/arcmin:** 18 × 14
Dec: $-35°24'$ **Spectral index:** ? **Type:** S

Radio: Elongated shell, adjacent to bright HII region.

Point sources: Pulsar nearby.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 74″ : $S = 11$).

G351.9 − 0.9

RA: $17^h25^m30^s$ **1-GHz flux/Jy:** 1.8? **Size/arcmin:** 12 × 9
Dec: $-36°14'$ **Spectral index:** ? **Type:** S

Radio: Asymmetric shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz (43″ × 73″ : $S = 2.0$).

G352.7 − 0.1

RA: $17^h24^m20^s$ **1-GHz flux/Jy:** 4 **Size/arcmin:** 8×6
Dec: $-35°05'$ **Spectral index:** 0.6 **Type:** S

Radio: Distorted shell.

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

G354.1 + 0.1

RA: $17^h27^m10^s$ **1-GHz flux/Jy:** ? **Size/arcmin:** 15×3?
Dec: $-33°44'$ **Spectral index:** varies? **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 ($47'' \times 99''$) and 1.4 GHz ($8''.8 \times 21''$).

G354.8 − 0.8

RA: $17^h32^m40^s$ **1-GHz flux/Jy:** 2.8? **Size/arcmin:** 19
Dec: $-33°40'$ **Spectral index:** ? **Type:** S

Radio: Distorted shell.

References:
Whiteoak & Green 1996, A&AS, 118, 329. MOST at 843 MHz ($43'' \times 78'' : S = 3.1$).

G355.6 − 0.0

RA: $17^h32^m00^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 6×8
Dec: $-32°36'$ **Spectral index:** ? **Type:** S

Radio: Well defined shell.

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

G355.9 − 2.5

RA: $17^h42^m35^s$ **1-GHz flux/Jy:** 8 **Size/arcmin:** 13
Dec: $-33°42'$ **Spectral index:** 0.5 **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 ($43'' \times 77''$).
Dubner *et al.* 1993, AJ, 105, 2251. VLA at 1.47 GHz ($32'' \times 34'' : S = 5.0 \pm 0.3$).
Gray 1994, MNRAS, 270, 836. MOST at 843 MHz ($43'' \times 77''$).

G356.3 − 0.3

RA: $17^h34^m40^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 7×11
Dec: $-32°14'$ **Spectral index:** ? **Type:** S

Radio: Elongated shell, brighter in N.

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

G356.3 − 1.5

RA: $17^h39^m20^s$ **1-GHz flux/Jy:** 3? **Size/arcmin:** 15×20
Dec: $-32°51'$ **Spectral index:** ? **Type:** S

Radio: Double arc.

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

G357.7 − 0.1 MSH 17−39

RA: $17^h37^m15^s$ **1-GHz flux/Jy:** 37 **Size/arcmin:** 3×8?
Dec: $-30°56'$ **Spectral index:** 0.4 **Type:** ?

Has been suggested that this is not a SNR.

Radio: Multiple arcs and filaments.

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

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

G357.7 + 0.3

RA: $17^h35^m20^s$ **1-GHz flux/Jy:** 10 **Size/arcmin:** 24
Dec: $-30°42'$ **Spectral index:** 0.4? **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: $17^h43^m35^s$ **1-GHz flux/Jy:** 23 **Size/arcmin:** 23
Dec: $-30°15'$ **Spectral index:** 0.5 **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: $17^h42^m20^s$ **1-GHz flux/Jy:** 14 **Size/arcmin:** 24
Dec: $-29°56'$ **Spectral index:** 0.4? **Type:** S

Radio: Non-thermal shell in complex region, crossed by the "snake".

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

References:

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

G359.1 + 0.9

RA: $17^h36^m25^s$ **1-GHz flux/Jy:** 5? **Size/arcmin:** 11×12
Dec: $-29°09'$ **Spectral index:** ? **Type:** S

Radio: Shell, brightest in E.

References:

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