# A Catalogue of Galactic Supernova Remnants
**(2004 January version)**

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as this paper – entitled 'Galactic Supernova Remnants: an Updated Catalogue and Some Statistics' – includes the summary data as an Appendix. If you make use of the detailed web-based version of the catalogue, then please also cite:

- Green D.A., 2004, *'A Catalogue of Galactic Supernova Remnants (2004 January version)'*, Mullard Radio Astronomy Observatory, Cavendish Laboratory, Cambridge, UK (available on the World-Wide-Web at "http://www.mrao.cam.ac.uk/surveys/snrs/").

## 1. The Catalogue Format

This catalogue of Galactic supernova remnants (SNRs) is an updated version of those presented in detail in Green (1984, 1988) and in summary form in Green (1991, 1996) – hereafter Versions I, II, III and IV respectively – and on the World-Wide-Web, in versions of 1995 July, 1996 August, 1998 September, 2000 August and 2001 December. (Version IV, although published in 1996, was produced in 1993, and a detailed version of this was made available on the World-Wide-Web in 1993 November. The summary data from the 2001 December version of the catalogue was also published as an Appendix in Stephenson & Green 2002.)

This, the 2004 January version of the catalogue, contains 231 SNRs (which is the same number as in the previous, 2001 December, version: one new remnant has been added, and one has been removed), with over a thousand references in the detailed listings, plus notes on several dozen possible or probable remnants.

For each remnant in the catalogue the following parameters are given.

- **Galactic Coordinates** of the source centroid, quoted to the nearest tenth of a degree as is conventional. (Note: in this catalogue additional leading zeros are not used.)
- **Other Names** that are commonly used for the remnant. These are given in parentheses if the remnant is only a part of the source. For some remnants, notably the Crab Nebula, not all common names are given.
- **Right Ascension** and **Declination** of the source centroid. The accuracy of the quoted values depends on the size of the remnant; for small remnants they are to the nearest few seconds of time and the nearest minute of arc respectively, whereas for larger remnants they are rounded to coarser values, but are in every case sufficient to specify a point within the boundary of the remnant. These coordinates are almost always deduced from radio maps rather than from X-ray or optical observations, and are for J2000.0.
- **Angular Size** of the remnant, in arcminutes, usually taken from the highest resolution radio map available. The boundary of most remnants approximates reasonably well to a circle or an ellipse; a single value is quoted for the angular size of the more nearly circular remnants, which is the diameter of a circle with an area equal to that of the remnant, but for elongated remnants the product of two values is quoted, and these are the major and minor axes of the remnant boundary modelled as an ellipse. In a few cases an ellipse is not a satisfactory description of the boundary of the object (refer to the description of the individual object given in its catalogue entry), although an angular size is still quoted for information. For 'filled-centre' remnants the size quoted is for the largest extent of the observed radio emission, not, as at times has been used by others, the half-width of the centrally brightened peak.

- **Flux Density** of the remnant at 1 GHz in jansky. This is *not* a measured value, but is deduced from the observed radio frequency spectrum of the source. The frequency of 1 GHz is chosen because flux density measurements at frequencies both above and below this value are usually available.
- **Spectral Index** of the integrated radio emission from the remnant, $\alpha$ (here defined in the sense, $S \propto \nu^{-\alpha}$, where $S$ is the flux density at a frequency $\nu$), either a value that is quoted in the literature, or one deduced from the available integrated flux densities of the remnant. For several SNRs a simple power law is not adequate to describe their radio spectra, either because there is evidence that the integrated spectrum is curved or the spectral index varies across the face of the remnant. In these cases the spectral index is given as 'varies' (refer to the description of the remnant and appropriate references in the detailed catalogue entry for more information). In some cases, for example where the remnant is highly confused with thermal emission, the spectral index is given as '?' since no value can be deduced with any confidence.
- **Type** of the SNR: 'S' or 'F' if the remnant shows a 'shell' or 'filled-centre' structure, or 'C' if it shows 'composite' (or 'combination') radio structure with a combination of shell and filled-centre characteristics; or 'S?', 'F?' or 'C?', respectively, if there is some uncertainty; or '?' in several cases where an object is conventionally regarded as an SNR even though its nature is poorly known or not well understood. Until recently only a few remnants were classified as composite remnants, as available observations were only able to identify the more obvious pulsar-powered, flatter radio spectrum filled-centre components within shells. However, in recent years improved observations – particularly in X-rays with the *Chandra* satellite – have identified many faint, pulsar powered nebulae in what until then had been identified as pure shell remnants. (Note: the term 'composite' has been used in a different sense by some authors, to describe SNRs with shell radio and centrally-brightened X-ray morphologies. An alternative term used to describe such remnants is 'mixed morphology', see Rho & Petre 1998.)

In the detailed listings, for each remnant, notes on a variety of topics are given. First, it is noted if other Galactic coordinates have at times been used to label it (usually before good observations have revealed the full extent of the object), if the SNR is thought to be the remnant of a historical SN, or if the nature of the source as an SNR has been questioned (in which case an appropriate reference is usually given later in the entry). Brief descriptions of the remnant from the available radio, optical and X-ray observations as applicable are then given, together with notes on available distance determinations, and any point sources or pulsars in or near the object (although they may not necessarily be related to the remnant). Finally, appropriate references to observations are given for each remnant, complete with journal, volume, page, and a short description of what information each paper contains (for radio observations these include the telescopes used, the observing frequencies and resolutions, together with any flux density determinations). These references are *not* complete, but cover representative and recent observations of the remnant – up to the end of 2003 – and they should themselves include references to earlier work. The references do not generally include large observational surveys – of particular interest in this respect are: the Effelsberg 100-m survey at 2.7 GHz of the Galactic plane $358^\circ < l < 240^\circ$, $|b| < 5^\circ$ by Reich *et al.* (1990) and Fürst *et al.* (1990a); reviews of the radio spectra of some SNRs by Kassim (1989), Kovalenko, Pynzar' & Udal'tsov (1994) and Trushkin (1998); the Parkes 64-m survey at 2.4 GHz of the Galactic plane $238^\circ < l < 365^\circ$, $|b| < 5^\circ$ by Duncan *et al.* (1995) and Duncan *et al.* (1997); the Molonglo Galactic plane survey at 843 MHz of $245^\circ < l < 355^\circ$, $|b| < 1.^\circ5$ by Green *et al.* (1999); the survey of $345^\circ < l < 255^\circ$, $|b| < 5^\circ$ at 8.35 and 14.35 GHz by Langston *et al.* (2000); reviews of *Einstein* X-ray imaging and spectroscopic observations of Galactic SNRs by Seward (1990) and Lum *et al.* (1992) respectively; surveys of *IRAS* observations of SNRs and their immediate surroundings by Arendt (1989) and by Saken, Fesen & Shull (1992); the survey of HI emission towards SNRs by Koo & Heiles (1991); and the catalogue by Fesen & Hurford (1996) of UV/optical/infra-red lines identified in SNRs.

A summary of the data available for all 231 remnants in the catalogue is given in Table I. The other names for SNRs are listed in Table II, and the abbreviations for journals, proceedings and telescopes are listed in Table III. The detailed listings for each SNR are given in Table IV.

## 2. Revisions and Notes

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

The following objects, which were listed in Version I of the catalogue were removed because they were no longer thought to be remnants, or were poorly observed (see Version II for references and further details): G2.4+1.4 (see also Gray 1994a; Goss & Lozinskaya 1995; Polcaro *et al.* 1995), G41.9–4.1 (=CTB 73, PKS 1920+06), G47.6+6.1 (=CTB 63), G53.9+0.3 (part of HC40), G93.4+1.8 (=NRAO 655), G123.2+2.9, G194.7+0.4 (the Origem Loop), G287.8–0.5 (see below), G322.3–1.2 (=Kes 24) and G343.0–6.0 (but see below). G350.1–0.3, which was listed in Version II of the catalogue, was removed as it is no longer thought to be a SNR (see Version III for details). G358.4–1.9, which was listed in Version IV of the catalogue, was removed, as following the discussion of Gray (1994a), as it is not clear that this is a SNR. G240.9–0.9, G299.0+0.2 and G328.0+0.3, which were listed in 1995 July version of the catalogue, were removed from the 1996 August version, following the improved observations of Duncan *et al.* (1996) and Whiteoak & Green (1996). For the 1998 September revision of the catalogue G350.0–1.8 was incorporated into G350.0–2.0, and G337.0–0.1 refers to a smaller remnant than that previously catalogued with the same name. G112.0+1.2, G117.4+5.0, G152.2–1.2 and G211.7–1.1 – which were reported as SNRs by Bonsignori-Facondi & Tomasi (1979) – were removed from the 2001 December version of the catalogue, as the first three of these are not confirmed as SNRs from the ongoing *Canadian Galactic Plane Survey* (Roland Kothes, private communication; but see below for further discussion of another proposed remnant, G213.0–0.6).

G10.0–0.3, which was regarded as a remnant – possibly associated with a soft-gamma repeater – was removed from this version of the catalogue, as it is now thought to be radio nebula powered by a stellar wind (see Gaensler *et al.* 2001, and references therein).

The following objects, which have been reported as SNRs, but have not been included in any of the versions of the SNR catalogue, have subsequently been shown not to be SNRs.

- G70.7+1.2, which was reported as a SNR by Reich *et al.* (1985), but this has not been confirmed by later observations (see Green 1986; de Muizon *et al.* 1988; Becker & Fesen 1988; Caswell 1988; Bally *et al.* 1989; Phillips, Onello & Kulkarni 1993; Onello *et al.* 1995).
- G81.6+1.0 a possible SNR in W75 reported by Ward-Thompson & Robson (1991). From the published data (see the observations in Wendker, Higgs & Landecker 1991) it was noted in Version IV of the catalogue that this is thermal source not a SNR, because of its thermal radio spectrum, and high infrared-to-radio emission (see also the subsequent discussion by Wendker *et al.* 1993).
- Green & Gull (1984) suggested G227.1+1.0 as a very young SNR, but subsequent observations (Channan *et al.* 1986; Green & Gull 1986) have shown that this is most likely an extragalactic source, not an SNR.
- A candidate SNR, G274.7–2.8, identified by Helfand & Channan (1989), has been shown not to be a SNR by Caswell & Stewart (1991).
- G159.6–18.5, was suggested as a SN by Pauls & Schwartz (1989), from IRAS and other observations, but is probably an HII region (see Andersson *et al.* 2000).
- G25.5+0.2, which was reported as a very young SNR by Cowan *et al.* (1989), although this identification was not certain (see White & Becker 1990; Green 1990; Zijlstra 1991). Sramek *et al.* (1992) report the detection of recombination lines from this source (also see Subrahmanyan *et al.* 1993). Becklin *et al.* (1994) identify G25.5+0.2 as a ring nebula around a luminous blue star. See also Clark, Steele & Lanfer (2000), who identified a bipolar shell around G25.5+0.2 with similarities to $\eta$ Carinae.
- Most of the possible SNRs listed by Gorham (1990) – following up SNR candidates suggested by Kassim (1988) – have been shown not to be SNRs by Gorham, Kulkarni & Prince (1993).
- G203.2–12.3, a optical ring about 3 arcmin in diameter, was reported as a possible SNR by Winkler & Reipurth (1992), but was shown to be a Herbig–Haro object (HH 311) by Reipurth, Bally & Devine (1997).
- G359.87+0.18 was reported as a possible young SNR near the Galactic Centre by Yusef-Zadeh, Cotton & Reynolds (1998), but was shown to be a radio galaxy by Lazio *et al.* (1999).
- G106.6+2.9, a small remnant proposed by Halpern *et al.* (2001), is incorporated into the larger catalogued remnant G106.3+2.7.

Some entries in the catalogue have been renamed, due to improved observations revealing a larger true extent for the object (previously G5.3–1.0 is now G5.4–1.2; G193.3–1.5 is now G192.8–1.1; G308.7+0.0 is now incorporated into G308.8–0.1). G337.0–0.1 now refers to a small (1.5 arcmin) remnant, rather than larger supposed remnant at this position (see Sarma *et al.* 1997), and G350.0–2.0 now incorporates the previously catalogued G350.0–1.8, based on the improved observations of Gaensler (1998).

## *2.2 New SNRs*

The following remnants were added to Version II of the catalogue: G0.9+0.1, G1.9+0.3, G5.9+3.1, G6.4+4.0, G8.7–0.1, G16.8–1.1, G18.9–1.1, G20.0–0.2, G27.8+0.6, G30.7+1.0, G31.5–0.6, G36.6–0.7, G42.8+0.6, G45.7–0.4, G54.1+0.3, G73.9+0.9, G179.0+2.6, G312.4–0.4, G357.7+0.3 and G359.1–0.5.

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

The following remnants were added to Version IV of the catalogue: G59.5+0.1, G67.7+1.8, G84.9+0.5, G156.2+5.7, G318.9+0.4, G322.5–0.1, G343.1–2.3 and G348.5–0.0.

The following remnants were added to 1995 July version of the catalogue: G1.0–0.1, G1.4–0.1, G3.7–0.2, G3.8+0.3, G28.8+1.5, G76.9+1.0, G272.2–3.2, G341.2+0.9, G354.1+0.1, G355.6–0.0, G356.3–0.3, G356.3–1.5 and G359.1+0.9.

The following remnants were added to the 1996 August version of the catalogue: G13.3–1.3 G286.5–1.2, G289.7–0.3, G294.1–0.0, G299.2–2.9 G299.6–0.5, G301.4–1.0, G308.1–0.7, G310.6–0.3, G310.8–0.4, G315.9–0.0, G317.3–0.2, G318.2+0.1, G320.6–1.6, G321.9–1.1, G327.4+1.0, G329.7+0.4, G342.1+0.9, G343.1–0.7, G345.7–0.2, G349.2–0.1, G351.7+0.8, G351.9–0.9 and G354.8–0.8.

The following remnants were added to the 1998 September version of the catalogue: G0.3+0.0, G32.1–0.9, G55.0+0.3, G63.7+1.1 and G182.4+4.3.

The following remnants were added to the 2000 August version of the catalogue: G7.0–0.1, G16.2–2.7, G29.6+0.1, G266.2–1.2 and G347.3–0.5.

The following remnants were added to the 2001 December version of the catalogue: G4.8+6.2, G28.6–0.1, G85.4+0.7, G85.9–0.6, G106.3+2.7, G292.2–0.5, G343.0–6.0 G353.9–2.0, G356.2+4.5 and G358.0+3.8.

The following remnant has been added to this version of the catalogue.

- G312.5–3.0, which was suspected as a SNR by Duncan *et al.* (1997), and has been confirmed by improved radio observations by Kane & Vaughan (2003).

## *2.3 Possible and probable SNRs not listed in the catalogue*

The following are possible or probable SNRs for which further observations are required to confirm their nature or parameters, or for which observations are not yet in the published literature.

### *2.3.1 Radio*

- A possible SNR near the Galactic centre reported by Ho *et al.* (1985) from radio observations (see also Coil & Ho 2000; Lu, Wang & Lang 2003; Senda, Murakami & Koyama 2003, and references therein).
- Gosachinskiĭ (1985) reported evidence for non-thermal radio emission, presumably from SNRs, associated with several bright, thermal Galactic sources (also see Odegard 1986, who questions the reliability of some of Gosachinskiĭ's results).
- G300.1+9.4, a possible SNR nearly 2° in diameter reported by Dubner, Colomb & Giacani (1986) from radio observations.
- Routledge & Vaneldik (1988) report a possible faint radio shell SNR nearly 2° in diameter, near the young pulsar PSR 1930+22 – see also Gómez-González & del Romero (1983), who report a smaller (about 40 arcmin) possible SNR (G57.1+1.7) associated with this pulsar, and see Caswell, Landecker & Feldman (1985) and Kovalenko (1989).

- Five possible remnants (G45.9–0.1, G71.6–0.5, G72.2–0.3, G83.0–0.2 and G85.2–1.2) of the eleven reported by Taylor, Wallace & Goss (1992) from a radio survey of part of the Galactic plane. (Three of the other possible SNRs reported by Taylor *et al.*, are included in the catalogue as G55.0+0.3, G63.7+1.1 and G76.9+1.0.)
- A faint, poorly defined possible remnant G41.1+1.2 reported by Gorham, Kulkarni & Prince (1993) from radio observations.
- G9.7–0.1, a possible SNR report by Frail, Kassim & Weiler (1994) from radio observations.
- G104.7+2.8, a possible SNR reported by Green & Joncas (1994) from radio observations. However, recent observations at 10.7 GHz (Wolfgang Reich, private communication) cast doubt on this identification, as they do not support a non-thermal radio spectrum for the source.
- G355.4+0.7, G356.6+0.1, G357.1–0.2, G358.1+1.0, G358.5–0.9, G358.7+0.7, G359.2–1.1, G3.1–0.6 and G4.2+0.0, which are among the possible SNRs listed by Gray (1994b) from radio observations near the Galactic centre. See also Roy & Pramesh Rao (2002) who present additional observations of G356.3-0.3, G356.6+0.1, G357.1-0.2 and G3.1–0.6 which they consider as possible SNRs, and Bhatnagar (2002) for additional observations of G4.2+0.0 which appears to be a thermal source.
- G11.2–1.1, a possible SNR listed by Kovalenko, Pynzar' & Udal'tsov (1994), based on unpublished radio studies (Trushkin 1988, preprint).
- Duncan *et al.* (1995) and Duncan *et al.* (1997) list several large-scale (1.5 to 10 degree), and smaller, low radio surface-brightness candidate SNRs from the Parkes 2.4-GHz survey of $270^\circ < l < 360^\circ$. Several of these candidates have been confirmed as SNRs by subsequent, improved observations, and are included in the catalogue.
- Whiteoak & Green (1996), from their radio survey of much of the southern Galactic plane, list 16 possible SNRs (G308.4–1.4, G317.5+0.9, G319.9–0.7, G320.6–0.9, G322.7+0.1, G322.9–0.0, G323.2–1.0, G324.1+0.1, G325.0–0.3, G331.8–0.0, G337.2+0.1, G339.6–0.6, G345.1+0.2, G345.1–0.2, G348.8+1.1 and G350.1–0.3).
- Several candidate SNRs reported by Combi & Romero (1998), Combi, Romero & Arnal (1998), Combi, Romero & Benaglia (1998), Punsly *et al.* (2000) and Combi *et al.* (2001).
- G359.09–0.02, a possible SNR noted by LaRosa *et al.* (2000).
- A possible SNR, near $l = 313^\circ$, which is close to an unidentified Galactic plane $\gamma$-ray source (see Roberts *et al.* 1999), and to a pulsar (Roberts, Romani & Johnston 2001).
- Gaensler *et al.* (2000), in a search for pulsar wind nebulae, found a small shell of radio emission near PSR B1356–60 – which they designate G311.28+1.09 – which may be a supernova remnant.
- A possible SNR, G328.6–0.0, noted by McClure-Griffiths *et al.* (2001) in the test region of the *Southern Galactic Plane Survey*.
- G346.5–0.1, an arc of radio emission observed by Gaensler *et al.* (2001), which is potentially part of a SNR, but requires further observations to confirm its nature.
- Giacani *et al.* (2001) presented observations of a pulsar wind nebula around PSR J1709–4428, which may be part of the catalogued remnant G343.1–2.3, or may represent another object.
- A possible faint remnant, G213.0–0.6, noted by Reich, Zhang & Fürst (2003), which is not well defined by current observations (this incorporates one of the faint remnants which was proposed by Bonsignori-Facondi & Tomasi 1979, see above).
- G282.8–1.2, a possible young SNR noted by Misanovic, Cram & Green (2002).
- Three possible remnants – G41.5+0.4, G42.0–0.0 and G43.5+0.6 – identified by Kaplan *et al.* (2002).
- G107.5–1.5, a probable remnant identified at by Kothes (2003), but the full extent of which is not well defined at present.
- Zhang (2003) identified four candidate SNRs from radio surveys. One of these – called G41.9+0.04 by Zhang – has been already noted as a possible remnant by Kaplan *et al.* (2002), see above. A second – G74.8+0.63 – which Zhang identified as a possible remnant partly on the basis of its non-thermal radio spectrum, actually has a flat, thermal radio spectrum, an has long been identified as an HII region (e.g. Weiler & Shaver 1978; Pineault & Chastenay 1990). Another source – G47.8+2.03 – also may have a thermal radio spectrum, given its published 2.7-GHz flux density (Fürst *et al.* 1990b).

### *2.3.2 UV/Optical/Infra-red*

- A possible SNR overlapping G296.1–0.5, identified from optical (and X-ray) observations by Hutchings, Crampton & Cowley (1981).
- A SNR (G260.4–3.3) about 4 arcmin in diameter within the Puppis A remnant identified optically by Winkler *et al.* (1989). This has not been detected at radio wavelengths (see Dubner *et al.* 1991).
- A possible SNR (G32.1+0.1) reported from optical spectroscopy by Thompson, Djorgovski & de Carvalho (1991), following up radio and infrared observations of Jones, Garwood & Dickey (1988).
- G75.5+2.4, a possible large (about 2°) old SNR in Cygnus suggested by Nichols-Bohlin & Fesen (1993) from infra-red and optical observations (see also Dewdney & Lozinskaya 1994; Marston 1996; Esipov *et al.* 1996).
- A possible optical SNR (G247.8+4.9) noted by Weinberger (1995), which may be Balmer dominated (see also Weinberger *et al.* 1998 and Zanin & Kerber 2000).
- An optical shell around the Coalsack Nebula (near $l = 300°$, $b = 0°$) identified by Walker & Zealey (1998). This coincides with one of the large possible SNRs suggested by Duncan *et al.* (1995), from radio observations.
- A probably SNR which was identified by Bally & Reipurth (2001) – which they label as G110.3+11.3 – from optical filaments (and which is also associated with a large HI and CO cavity, and soft X-ray enhancement).
- A possible remnant, near $l = 70°, b = 2°$ noted by Mavromatakis *et al.* (2002).
- A large, approximately 24° diameter, optical and X-ray loop in Antila (McCullough, Fields & Pavlidou 2002).
- Optical filaments in Pegausus (Boumis *et al.* 2002) which suggest one or more possible SNRs in this region.

### *2.3.3 X-ray*

- H1538–32 a large X-ray source in Lupus, near $l = 307°$, $b = +20°$ (Riegler, Agrawal & Gull 1980; see also Colomb, Dubner & Giacani 1984; Gahm *et al.* 1990) which is a possible old SNR;
- The Monogem ring, near $l = 203°$, $b = +12°$, is a possible old SNR (see Nousek *et al.* 1981; Plucinsky *et al.* 1996; Thorsett *et al.* 2003, and references therein).
- X-ray emission in the Gum Nebula near $l = 250°$, $b = 0°$ (Leahy, Nousek & Garmire 1992, see also Reynolds 1976, Dubner *et al.* 1992, Duncan *et al.* 1996, Reynoso & Dubner 1997, Heiles 1998) which, together with optical spectroscopy indicate the existence of a possible old remnant in this region.
- An X-ray enhancement near $l = 200°$, $b = –40°$, which is possibly due to an old SNR in Eridanus (Naranan *et al.* 1976; see also Burrows *et al.* 1993; Snowden *et al.* 1995; Heiles 1998, Boumis *et al.* 2001).
- G189.6+3.3, a faint, possible SNR overlapping G189.1+3.0 (=IC443) identified by Asaoka & Aschenbach (1994) from ROSAT X-ray observations.
- G117.7+0.6, a faint shell of soft X-ray emission near CTB 1 (=G116.9+0.2), which contains a pulsar (Hailey & Craig 1995; see also Craig, Hailey & Pisarski 1997).
- A possible SNR identified in X-rays around the pulsar B1828–13 (see Finley, Srinivasan & Park 1996).
- A possible, large SNR, G69.4+1.2, identified as an X-ray shell by Yoshita, Miyata & Tsunemi (1999, 2000). See also Mavromatakis, Boumis & Paleologou (2002).
- Possible SNRs identified in the *ROSAT* All-Sky Survey are discussed briefly by Schaudel *et al.* (2002).
- G0.570–0.018 a small ring of X-ray emission near the Galactic Centre, which has been proposed as a very young remnant by Senda, Murakami & Koyama (2002). See also Senda, Murakami & Koyama (2003), who identify other possible SNRs near the Galactic Centre from their X-ray emission.
- Three probable SNRs (G11.0+0.0, G25.5+0.0 and G26.6–0.1) identified by Bamba *et al.* (2003) from their hard X-ray emission.

#### *2.3.4 Other*

- G287.8–0.5, which is associated with η Carinae, was listed in Version I as a SNR, but was removed from the catalogue in Version II as its parameters are uncertain (see Jones 1973; Retallack 1984; Tateyama, Strauss & Kaufmann 1991; and the discussion in Version II).
- G359.2–0.8 (the 'mouse'), near the Galactic centre, which has been suggested as being analogous to the central region of CTB 80 (=G69.0+2.7) by Predehl & Kulkarni (1995), i.e. a pulsar powered nebula (see also Camilo *et al.* 2002).

It should also be noted that: (a) some radio continuum and HI loops in the Galactic plane (e.g. Berkhuijsen 1973) may be parts of very large, old SNRs, but they have not been included in the catalogue (see also Combi *et al.* 1995; Maciejewski *et al.* 1996; Kim & Koo 2000; Normandeau *et al.* 2000; Woermann, Gaylard & Otrupcek 2001; Stil & Irwin 2001; Uyanıker & Kothes 2002); (b) the distinction between filled-centre remnants and pulsar wind nebula is not clear, and isolated, generally faint, pulsar wind nebulae are also not included in the catalogue (e.g. Gaensler *et al.* 1998; Giacani *et al.* 2001; Jones, Stappers & Gaensler 2002; Braje *et al.* 2003; Gaensler *et al.* 2003).

### *2.4 Questionable SNRs listed in the catalogue*

As noted in Versions II and IV of the catalogue, the following sources are listed as SNRs, although, as discussed in each case, the identifications are not certain: G5.4–1.2, G39.7–2.0 (=W50), G65.7+1.2 (=DA 495), G69.0+2.7 (=CTB 80), G318.9+0.4 and G357.7–0.1. The nature of G76.9+1.0 (an unusual radio source similar to G65.7+1.2), and of G354.1+0.1 (which appears may be similar to G357.7–0.1 (=MHS 17–39)) are also uncertain (see Landecker, Higgs & Wendker 1993 and Frail, Goss & Whiteoak 1994).

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

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| $l$ | $b$ | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 0.0 | +0.0 | 17 45 44 | –29 00 | 3.5 × 2.5 | S | 100? | 0.8? | Sgr A East |
| 0.3 | +0.0 | 17 46 15 | –28 38 | 15 × 8 | S | 22 | 0.6 | |
| 0.9 | +0.1 | 17 47 21 | –28 09 | 8 | C | 18? | varies | |
| 1.0 | –0.1 | 17 48 30 | –28 09 | 8 | S | 15 | 0.6? | |
| 1.4 | –0.1 | 17 49 39 | –27 46 | 10 | S | 2? | ? | |
| 1.9 | +0.3 | 17 48 45 | –27 10 | 1.2 | S | 0.6 | 0.7 | |
| 3.7 | –0.2 | 17 55 26 | –25 50 | 14 × 11 | S | 2.3 | 0.65 | |
| 3.8 | +0.3 | 17 52 55 | –25 28 | 18 | S? | 3? | 0.6 | |
| 4.2 | –3.5 | 18 08 55 | –27 03 | 28 | S | 3.2? | 0.6? | |
| 4.5 | +6.8 | 17 30 42 | –21 29 | 3 | S | 19 | 0.64 | Kepler, SN1604, 3C358 |
| 4.8 | +6.2 | 17 33 25 | –21 34 | 18 | S | 3 | 0.6 | |
| 5.2 | –2.6 | 18 07 30 | –25 45 | 18 | S | 2.6? | 0.6? | |
| 5.4 | –1.2 | 18 02 10 | –24 54 | 35 | C? | 35? | 0.2? | Milne 56 |
| 5.9 | +3.1 | 17 47 20 | –22 16 | 20 | S | 3.3? | 0.4? | |
| 6.1 | +1.2 | 17 54 55 | –23 05 | 30 × 26 | F | 4.0? | 0.3? | |
| 6.4 | –0.1 | 18 00 30 | –23 26 | 48 | C | 310 | varies | W28 |
| 6.4 | +4.0 | 17 45 10 | –21 22 | 31 | S | 1.3? | 0.4? | |
| 7.0 | –0.1 | 18 01 50 | –22 54 | 15 | S | 2.5? | 0.5? | |
| 7.7 | –3.7 | 18 17 25 | –24 04 | 22 | S | 11 | 0.32 | 1814–24 |
| 8.7 | –5.0 | 18 24 10 | –23 48 | 26 | S | 4.4 | 0.3 | |
| 8.7 | –0.1 | 18 05 30 | –21 26 | 45 | S? | 80 | 0.5 | (W30) |
| 9.8 | +0.6 | 18 05 08 | –20 14 | 12 | S | 3.9 | 0.5 | |
| 11.2 | –0.3 | 18 11 27 | –19 25 | 4 | C | 22 | 0.6 | |
| 11.4 | –0.1 | 18 10 47 | –19 05 | 8 | S? | 6 | 0.5 | |
| 12.0 | –0.1 | 18 12 11 | –18 37 | 7? | ? | 3.5 | 0.7 | |
| 13.3 | –1.3 | 18 19 20 | –18 00 | 70 × 40 | S? | ? | ? | |
| 13.5 | +0.2 | 18 14 14 | –17 12 | 5 × 4 | S | 3.5? | 1.0? | |
| 15.1 | –1.6 | 18 24 00 | –16 34 | 30 × 24 | S | 5.5? | 0.8? | |
| 15.9 | +0.2 | 18 18 52 | –15 02 | 7 × 5 | S? | 5 | 0.6? | |
| 16.2 | –2.7 | 18 28 50 | –16 11 | 17 | S | 2 | 0.5 | |
| 16.7 | +0.1 | 18 20 56 | –14 20 | 4 | C | 3.0 | 0.6 | |
| 16.8 | –1.1 | 18 25 20 | –14 46 | 30 × 24? | ? | 2? | ? | |
| 17.4 | –2.3 | 18 30 55 | –14 52 | 24? | S | 4.8? | 0.8? | |
| 17.8 | –2.6 | 18 32 50 | –14 39 | 24 | S | 4.0? | 0.3? | |
| 18.8 | +0.3 | 18 23 58 | –12 23 | 17 × 11 | S | 33 | 0.4 | Kes 67 |
| 18.9 | –1.1 | 18 29 50 | –12 58 | 33 | C? | 37 | varies | |
| 20.0 | –0.2 | 18 28 07 | –11 35 | 10 | F | 10 | 0.0 | |
| 21.5 | –0.9 | 18 33 33 | –10 35 | 4 | C | 6? | 0.0 | |
| 21.8 | –0.6 | 18 32 45 | –10 08 | 20 | S | 69 | 0.5 | Kes 69 |
| 22.7 | –0.2 | 18 33 15 | –09 13 | 26 | S? | 33 | 0.6 | |
| 23.3 | –0.3 | 18 34 45 | –08 48 | 27 | S | 70 | 0.5 | W41 |
| 23.6 | +0.3 | 18 33 03 | –08 13 | 10? | ? | 8? | 0.3 | |
| 24.7 | –0.6 | 18 38 43 | –07 32 | 15? | S? | 8 | 0.5 | |
| 24.7 | +0.6 | 18 34 10 | –07 05 | 30 × 15 | C? | 20? | 0.2? | |
| 27.4 | +0.0 | 18 41 19 | –04 56 | 4 | S | 6 | 0.68 | 4C–04.71 |

| $l$ | $b$ | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 27.8 | +0.6 | 18 39 50 | –04 24 | 50 × 30 | F | 30 | varies | |
| 28.6 | –0.1 | 18 43 55 | –03 53 | 13 × 9 | S | 3? | ? | |
| 28.8 | +1.5 | 18 39 00 | –02 55 | 100? | S? | ? | 0.4? | |
| 29.6 | +0.1 | 18 44 52 | –02 57 | 5 | S | 1.5? | 0.5? | |
| 29.7 | –0.3 | 18 46 25 | –02 59 | 3 | C | 10 | 0.7 | Kes 75 |
| 30.7 | –2.0 | 18 54 25 | –02 54 | 16 | ? | 0.5? | 0.7? | |
| 30.7 | +1.0 | 18 44 00 | –01 32 | 24 × 18 | S? | 6 | 0.4 | |
| 31.5 | –0.6 | 18 51 10 | –01 31 | 18? | S? | 2? | ? | |
| 31.9 | +0.0 | 18 49 25 | –00 55 | 7 × 5 | S | 24 | 0.55 | 3C391 |
| 32.0 | –4.9 | 19 06 00 | –03 00 | 60? | S? | 22? | 0.5? | 3C396.1 |
| 32.1 | –0.9 | 18 53 10 | –01 08 | 40? | C? | ? | ? | |
| 32.8 | –0.1 | 18 51 25 | –00 08 | 17 | S? | 11? | 0.2? | Kes 78 |
| 33.2 | –0.6 | 18 53 50 | –00 02 | 18 | S | 3.5 | varies | |
| 33.6 | +0.1 | 18 52 48 | +00 41 | 10 | S | 22 | 0.5 | Kes 79, 4C00.70, HC13 |
| 34.7 | –0.4 | 18 56 00 | +01 22 | 35 × 27 | C | 230 | 0.30 | W44, 3C392 |
| 36.6 | –0.7 | 19 00 35 | +02 56 | 25? | S? | ? | ? | |
| 36.6 | +2.6 | 18 48 49 | +04 26 | 17 × 13? | S | 0.7? | 0.5? | |
| 39.2 | –0.3 | 19 04 08 | +05 28 | 8 × 6 | C | 18 | 0.6 | 3C396, HC24, NRAO 593 |
| 39.7 | –2.0 | 19 12 20 | +04 55 | 120 × 60 | ? | 85? | 0.7? | W50, SS433 |
| 40.5 | –0.5 | 19 07 10 | +06 31 | 22 | S | 11 | 0.5 | |
| 41.1 | –0.3 | 19 07 34 | +07 08 | 4.5 × 2.5 | S | 22 | 0.48 | 3C397 |
| 42.8 | +0.6 | 19 07 20 | +09 05 | 24 | S | 3? | 0.5? | |
| 43.3 | –0.2 | 19 11 08 | +09 06 | 4 × 3 | S | 38 | 0.48 | W49B |
| 43.9 | +1.6 | 19 05 50 | +10 30 | 60? | S? | 8.6? | 0.2? | |
| 45.7 | –0.4 | 19 16 25 | +11 09 | 22 | S | 4.2? | 0.4? | |
| 46.8 | –0.3 | 19 18 10 | +12 09 | 17 × 13 | S | 14 | 0.5 | (HC30) |
| 49.2 | –0.7 | 19 23 50 | +14 06 | 30 | S? | 160? | 0.3? | (W51) |
| 53.6 | –2.2 | 19 38 50 | +17 14 | 33 × 28 | S | 8 | 0.75 | 3C400.2, NRAO 611 |
| 54.1 | +0.3 | 19 30 31 | +18 52 | 1.5 | F? | 0.5 | 0.1 | |
| 54.4 | –0.3 | 19 33 20 | +18 56 | 40 | S | 28 | 0.5 | (HC40) |
| 55.0 | +0.3 | 19 32 00 | +19 50 | 20 × 15? | S | 0.5? | 0.5? | |
| 55.7 | +3.4 | 19 21 20 | +21 44 | 23 | S | 1.4 | 0.6 | |
| 57.2 | +0.8 | 19 34 59 | +21 57 | 12? | S? | 1.8? | ? | (4C21.53) |
| 59.5 | +0.1 | 19 42 33 | +23 35 | 5 | S | 3? | ? | |
| 59.8 | +1.2 | 19 38 55 | +24 19 | 20 × 16? | ? | 1.6 | 0.5 | |
| 63.7 | +1.1 | 19 47 52 | +27 45 | 8 | F | 1.8 | 0.3 | |
| 65.1 | +0.6 | 19 54 40 | +28 35 | 90 × 50 | S | 6 | 0.6 | |
| 65.3 | +5.7 | 19 33 00 | +31 10 | 310 × 240 | S? | 52? | 0.6? | |
| 65.7 | +1.2 | 19 52 10 | +29 26 | 18 | ? | 5.1 | 0.6 | DA 495 |
| 67.7 | +1.8 | 19 54 32 | +31 29 | 9 | S | 1.4 | 0.3 | |
| 68.6 | –1.2 | 20 08 40 | +30 37 | 28 × 25? | ? | 0.7? | 0.0? | |
| 69.0 | +2.7 | 19 53 20 | +32 55 | 80? | ? | 120? | varies | CTB 80 |
| 69.7 | +1.0 | 20 02 40 | +32 43 | 16 | S | 1.6 | 0.8 | |
| 73.9 | +0.9 | 20 14 15 | +36 12 | 22? | S? | 9? | 0.3? | |
| 74.0 | –8.5 | 20 51 00 | +30 40 | 230 × 160 | S | 210 | varies | Cygnus Loop |

| *l* | *b* | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 74.9 | +1.2 | 20 16 02 | +37 12 | 8 × 6 | F | 9 | varies | CTB 87 |
| 76.9 | +1.0 | 20 22 20 | +38 43 | 12 × 9 | ? | 2 | 0.6 | |
| 78.2 | +2.1 | 20 20 50 | +40 26 | 60 | S | 340 | 0.5 | DR4, γ Cygni SNR |
| 82.2 | +5.3 | 20 19 00 | +45 30 | 95 × 65 | S | 120? | 0.5? | W63 |
| 84.2 | –0.8 | 20 53 20 | +43 27 | 20 × 16 | S | 11 | 0.5 | |
| 84.9 | +0.5 | 20 50 30 | +44 53 | 6 | S | 0.8 | 0.4 | |
| 85.4 | +0.7 | 20 50 40 | +45 22 | 24 | S | ? | 0.5? | |
| 85.9 | –0.6 | 20 58 40 | +44 53 | 24 | S | ? | 0.5? | |
| 89.0 | +4.7 | 20 45 00 | +50 35 | 120 × 90 | S | 220 | 0.40 | HB21 |
| 93.3 | +6.9 | 20 52 25 | +55 21 | 27 × 20 | S | 9 | 0.54 | DA 530, 4C(T)55.38.1 |
| 93.7 | –0.2 | 21 29 20 | +50 50 | 80 | S | 65 | 0.4 | CTB 104A, DA 551 |
| 94.0 | +1.0 | 21 24 50 | +51 53 | 30 × 25 | S | 15 | 0.44 | 3C434.1 |
| 106.3 | +2.7 | 22 27 30 | +60 50 | 60 × 24 | ? | 6 | 0.6 | |
| 109.1 | –1.0 | 23 01 35 | +58 53 | 28 | S | 20 | 0.50 | CTB 109 |
| 111.7 | –2.1 | 23 23 26 | +58 48 | 5 | S | 2720 | 0.77 | Cassiopeia A, 3C461 |
| 114.3 | +0.3 | 23 37 00 | +61 55 | 90 × 55 | S | 6? | 0.3? | |
| 116.5 | +1.1 | 23 53 40 | +63 15 | 80 × 60 | S | 11? | 0.8? | |
| 116.9 | +0.2 | 23 59 10 | +62 26 | 34 | S | 9? | 0.5? | CTB 1 |
| 119.5 | +10.2 | 00 06 40 | +72 45 | 90? | S | 36 | 0.6 | CTA 1 |
| 120.1 | +1.4 | 00 25 18 | +64 09 | 8 | S | 56 | 0.61 | Tycho, 3C10, SN1572 |
| 126.2 | +1.6 | 01 22 00 | +64 15 | 70 | S? | 7 | varies | |
| 127.1 | +0.5 | 01 28 20 | +63 10 | 45 | S | 13 | 0.6 | R5 |
| 130.7 | +3.1 | 02 05 41 | +64 49 | 9 × 5 | F | 33 | 0.10 | 3C58, SN1181 |
| 132.7 | +1.3 | 02 17 40 | +62 45 | 80 | S | 45 | 0.6 | HB3 |
| 156.2 | +5.7 | 04 58 40 | +51 50 | 110 | S | 5 | 0.5 | |
| 160.9 | +2.6 | 05 01 00 | +46 40 | 140 × 120 | S | 110 | 0.6 | HB9 |
| 166.0 | +4.3 | 05 26 30 | +42 56 | 55 × 35 | S | 7? | 0.4? | VRO 42.05.01 |
| 166.2 | +2.5 | 05 19 00 | +41 55 | 90 × 70 | S | 11 | 0.5 | OA 184 |
| 179.0 | +2.6 | 05 53 40 | +31 05 | 70 | S? | 7 | 0.4 | |
| 180.0 | –1.7 | 05 39 00 | +27 50 | 180 | S | 65 | varies | S147 |
| 182.4 | +4.3 | 06 08 10 | +29 00 | 50 | S | 1.2 | 0.4 | |
| 184.6 | –5.8 | 05 34 31 | +22 01 | 7 × 5 | F | 1040 | 0.30 | Crab Nebula, 3C144, SN1054 |
| 189.1 | +3.0 | 06 17 00 | +22 34 | 45 | C | 160 | 0.36 | IC443, 3C157 |
| 192.8 | –1.1 | 06 09 20 | +17 20 | 78 | S | 20? | 0.6? | PKS 0607+17 |
| 205.5 | +0.5 | 06 39 00 | +06 30 | 220 | S | 160 | 0.5 | Monoceros Nebula |
| 206.9 | +2.3 | 06 48 40 | +06 26 | 60 × 40 | S? | 6 | 0.5 | PKS 0646+06 |
| 260.4 | –3.4 | 08 22 10 | –43 00 | 60 × 50 | S | 130 | 0.5 | Puppis A, MSH 08–44 |
| 261.9 | +5.5 | 09 04 20 | –38 42 | 40 × 30 | S | 10? | 0.4? | |
| 263.9 | –3.3 | 08 34 00 | –45 50 | 255 | C | 1750 | varies | Vela (XYZ) |
| 266.2 | –1.2 | 08 52 00 | –46 20 | 120 | S | 50? | 0.3? | |
| 272.2 | –3.2 | 09 06 50 | –52 07 | 15? | S? | 0.4 | 0.6 | |
| 279.0 | +1.1 | 09 57 40 | –53 15 | 95 | S | 30? | 0.6? | |
| 284.3 | –1.8 | 10 18 15 | –59 00 | 24? | S | 11? | 0.3? | MSH 10–53 |
| 286.5 | –1.2 | 10 35 40 | –59 42 | 26 × 6 | S? | 1.4? | ? | |
| 289.7 | –0.3 | 11 01 15 | –60 18 | 18 × 14 | S | 6.2 | 0.2? | |

| *l* | *b* | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 290.1 | –0.8 | 11 03 05 | –60 56 | 19 × 14 | S | 42 | 0.4 | MSH 11–6*1*A |
| 291.0 | –0.1 | 11 11 54 | –60 38 | 15 × 13 | C | 16 | 0.29 | (MSH 11–6*2*) |
| 292.0 | +1.8 | 11 24 36 | –59 16 | 12 × 8 | C | 15 | 0.4 | MSH 11–5*4* |
| 292.2 | –0.5 | 11 19 20 | –61 28 | 20 × 15 | S | 7? | 0.6? | |
| 293.8 | +0.6 | 11 35 00 | –60 54 | 20 | C | 5? | 0.6? | |
| 294.1 | –0.0 | 11 36 10 | –61 38 | 40 | S | >2? | ? | |
| 296.1 | –0.5 | 11 51 10 | –62 34 | 37 × 25 | S | 8? | 0.6? | |
| 296.5 | +10.0 | 12 09 40 | –52 25 | 90 × 65 | S | 48 | 0.5 | PKS 1209–51/52 |
| 296.8 | –0.3 | 11 58 30 | –62 35 | 20 × 14 | S | 9 | 0.6 | 1156–62 |
| 298.5 | –0.3 | 12 12 40 | –62 52 | 5? | ? | 5? | 0.4? | |
| 298.6 | –0.0 | 12 13 41 | –62 37 | 12 × 9 | S | 5? | 0.3 | |
| 299.2 | –2.9 | 12 15 13 | –65 30 | 18 × 11 | S | 0.5? | ? | |
| 299.6 | –0.5 | 12 21 45 | –63 09 | 13 | S | 1.0? | ? | |
| 301.4 | –1.0 | 12 37 55 | –63 49 | 37 × 23 | S | 2.1? | ? | |
| 302.3 | +0.7 | 12 45 55 | –62 08 | 17 | S | 5? | 0.4? | |
| 304.6 | +0.1 | 13 05 59 | –62 42 | 8 | S | 14 | 0.5 | Kes 17 |
| 308.1 | –0.7 | 13 37 37 | –63 04 | 13 | S | 1.2? | ? | |
| 308.8 | –0.1 | 13 42 30 | –62 23 | 30 × 20? | C? | 15? | 0.4? | |
| 309.2 | –0.6 | 13 46 31 | –62 54 | 15 × 12 | S | 7? | 0.4? | |
| 309.8 | +0.0 | 13 50 30 | –62 05 | 25 × 19 | S | 17 | 0.5 | |
| 310.6 | –0.3 | 13 58 00 | –62 09 | 8 | S | 5? | ? | Kes 20B |
| 310.8 | –0.4 | 14 00 00 | –62 17 | 12 | S | 6? | ? | Kes 20A |
| 311.5 | –0.3 | 14 05 38 | –61 58 | 5 | S | 3? | 0.5 | |
| 312.4 | –0.4 | 14 13 00 | –61 44 | 38 | S | 45 | 0.36 | |
| 312.5 | –3.0 | 14 21 00 | –64 12 | 18 × 20 | S | 3.5? | ? | |
| 315.4 | –2.3 | 14 43 00 | –62 30 | 42 | S | 49 | 0.6 | RCW 86, MSH 14–6*3* |
| 315.4 | –0.3 | 14 35 55 | –60 36 | 24 × 13 | ? | 8 | 0.4 | |
| 315.9 | –0.0 | 14 38 25 | –60 11 | 25 × 14 | S | 0.8? | ? | |
| 316.3 | –0.0 | 14 41 30 | –60 00 | 29 × 14 | S | 20? | 0.4 | (MSH 14–5*7*) |
| 317.3 | –0.2 | 14 49 40 | –59 46 | 11 | S | 4.7? | ? | |
| 318.2 | +0.1 | 14 54 50 | –59 04 | 40 × 35 | S | >3.9? | ? | |
| 318.9 | +0.4 | 14 58 30 | –58 29 | 30 × 14 | C | 4? | 0.2? | |
| 320.4 | –1.2 | 15 14 30 | –59 08 | 35 | C | 60? | 0.4 | MSH 15–5*2*, RCW 89 |
| 320.6 | –1.6 | 15 17 50 | –59 16 | 60 × 30 | S | ? | ? | |
| 321.9 | –1.1 | 15 23 45 | –58 13 | 28 | S | >3.4? | ? | |
| 321.9 | –0.3 | 15 20 40 | –57 34 | 31 × 23 | S | 13 | 0.3 | |
| 322.5 | –0.1 | 15 23 23 | –57 06 | 15 | C | 1.5 | 0.4 | |
| 323.5 | +0.1 | 15 28 42 | –56 21 | 13 | S | 3? | 0.4? | |
| 326.3 | –1.8 | 15 53 00 | –56 10 | 38 | C | 145 | varies | MSH 15–5*6* |
| 327.1 | –1.1 | 15 54 25 | –55 09 | 18 | C | 7? | ? | |
| 327.4 | +0.4 | 15 48 20 | –53 49 | 21 | S | 30? | 0.6 | Kes 27 |
| 327.4 | +1.0 | 15 46 48 | –53 20 | 14 | S | 1.9? | ? | |
| 327.6 | +14.6 | 15 02 50 | –41 56 | 30 | S | 19 | 0.6 | SN1006, PKS 1459–41 |
| 328.4 | +0.2 | 15 55 30 | –53 17 | 5 | F | 15 | 0.12 | (MSH 15–5*7*) |
| 329.7 | +0.4 | 16 01 20 | –52 18 | 40 × 33 | S | >34? | ? | |

| *l* | *b* | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 330.0 | +15.0 | 15 10 00 | –40 00 | 180? | S | 350? | 0.5? | Lupus Loop |
| 330.2 | +1.0 | 16 01 06 | –51 34 | 11 | S? | 5? | 0.3 | |
| 332.0 | +0.2 | 16 13 17 | –50 53 | 12 | S | 8? | 0.5 | |
| 332.4 | –0.4 | 16 17 33 | –51 02 | 10 | S | 28 | 0.5 | RCW 103 |
| 332.4 | +0.1 | 16 15 20 | –50 42 | 15 | S | 26 | 0.5 | MSH 16–5*1*, Kes 32 |
| 335.2 | +0.1 | 16 27 45 | –48 47 | 21 | S | 16 | 0.5 | |
| 336.7 | +0.5 | 16 32 11 | –47 19 | 14 × 10 | S | 6 | 0.5 | |
| 337.0 | –0.1 | 16 35 57 | –47 36 | 1.5 | S | 1.5 | 0.6? | (CTB 33) |
| 337.2 | –0.7 | 16 39 28 | –47 51 | 6 | S | 2? | 0.7 | |
| 337.3 | +1.0 | 16 32 39 | –46 36 | 15 × 12 | S | 16 | 0.55 | Kes 40 |
| 337.8 | –0.1 | 16 39 01 | –46 59 | 9 × 6 | S | 18 | 0.5 | Kes 41 |
| 338.1 | +0.4 | 16 37 59 | –46 24 | 15? | S | 4? | 0.4 | |
| 338.3 | –0.0 | 16 41 00 | –46 34 | 8 | S | 7? | ? | |
| 338.5 | +0.1 | 16 41 09 | –46 19 | 9 | ? | 12? | ? | |
| 340.4 | +0.4 | 16 46 31 | –44 39 | 10 × 7 | S | 5 | 0.4 | |
| 340.6 | +0.3 | 16 47 41 | –44 34 | 6 | S | 5? | 0.4? | |
| 341.2 | +0.9 | 16 47 35 | –43 47 | 16 × 22 | C | 1.5? | 0.6? | |
| 341.9 | –0.3 | 16 55 01 | –44 01 | 7 | S | 2.5 | 0.5 | |
| 342.0 | –0.2 | 16 54 50 | –43 53 | 12 × 9 | S | 3.5? | 0.4? | |
| 342.1 | +0.9 | 16 50 43 | –43 04 | 10 × 9 | S | 0.5? | ? | |
| 343.0 | –6.0 | 17 25 00 | –46 30 | 250 | S | ? | ? | |
| 343.1 | –2.3 | 17 08 00 | –44 16 | 32? | C? | 8? | 0.5? | |
| 343.1 | –0.7 | 17 00 25 | –43 14 | 27 × 21 | S | 7.8 | 0.55 | |
| 344.7 | –0.1 | 17 03 51 | –41 42 | 10 | C? | 2.5? | 0.5 | |
| 345.7 | –0.2 | 17 07 20 | –40 53 | 6 | S | 0.6? | ? | |
| 346.6 | –0.2 | 17 10 19 | –40 11 | 8 | S | 8? | 0.5? | |
| 347.3 | –0.5 | 17 13 50 | –39 45 | 65 × 55 | S? | ? | ? | |
| 348.5 | –0.0 | 17 15 26 | –38 28 | 10? | S? | 10? | 0.4? | |
| 348.5 | +0.1 | 17 14 06 | –38 32 | 15 | S | 72 | 0.3 | CTB 37A |
| 348.7 | +0.3 | 17 13 55 | –38 11 | 17? | S | 26 | 0.3 | CTB 37B |
| 349.2 | –0.1 | 17 17 15 | –38 04 | 9 × 6 | S | 1.4? | ? | |
| 349.7 | +0.2 | 17 17 59 | –37 26 | 2.5 × 2 | S | 20 | 0.5 | |
| 350.0 | –2.0 | 17 27 50 | –38 32 | 45 | S | 26 | 0.4 | |
| 351.2 | +0.1 | 17 22 27 | –36 11 | 7 | C? | 5? | 0.4 | |
| 351.7 | +0.8 | 17 21 00 | –35 27 | 18 × 14 | S | 10? | ? | |
| 351.9 | –0.9 | 17 28 52 | –36 16 | 12 × 9 | S | 1.8? | ? | |
| 352.7 | –0.1 | 17 27 40 | –35 07 | 8 × 6 | S | 4 | 0.6 | |
| 353.9 | –2.0 | 17 38 55 | –35 11 | 13 | S | 1? | 0.5? | |
| 354.1 | +0.1 | 17 30 28 | –33 46 | 15 × 3? | C? | ? | varies? | |
| 354.8 | –0.8 | 17 36 00 | –33 42 | 19 | S | 2.8? | ? | |
| 355.6 | –0.0 | 17 35 16 | –32 38 | 8 × 6 | S | 3? | ? | |
| 355.9 | –2.5 | 17 45 53 | –33 43 | 13 | S | 8 | 0.5 | |
| 356.2 | +4.5 | 17 19 00 | –29 40 | 25 | S | 4 | 0.7 | |
| 356.3 | –0.3 | 17 37 56 | –32 16 | 11 × 7 | S | 3? | ? | |
| 356.3 | –1.5 | 17 42 35 | –32 52 | 20 × 15 | S | 3? | ? | |

| *l* | *b* | RA (J2000.0) (h m s) | Dec (° ′) | size /arcmin | type | Flux at 1 GHz/Jy | spectral index | other name(s) |
|---|---|---|---|---|---|---|---|---|
| 357.7 | –0.1 | 17 40 29 | –30 58 | 8 × 3? | ? | 37 | 0.4 | MSH 17–3*9* |
| 357.7 | +0.3 | 17 38 35 | –30 44 | 24 | S | 10 | 0.4? | |
| 358.0 | +3.8 | 17 26 00 | –28 36 | 38 | S | 1.5? | ? | |
| 359.0 | –0.9 | 17 46 50 | –30 16 | 23 | S | 23 | 0.5 | |
| 359.1 | –0.5 | 17 45 30 | –29 57 | 24 | S | 14 | 0.4? | |
| 359.1 | +0.9 | 17 39 36 | –29 11 | 12 × 11 | S | 5? | ? | |

| | |
|---|---|
| γ Cygni SNR | G78.2+2.1 |
| 1156–62 | G296.8–0.3 |
| 1814–24 | G7.7–3.7 |
| 3C10 | G120.1+1.4 |
| 3C58 | G130.7+3.1 |
| 3C144 | G184.6–5.8 |
| 3C157 | G189.1+3.0 |
| 3C358 | G4.5+6.8 |
| 3C391 | G31.9+0.0 |
| 3C392 | G34.7–0.4 |
| 3C396 | G39.2–0.3 |
| 3C396.1 | G32.0–4.9 |
| 3C397 | G41.1–0.3 |
| 3C400.2 | G53.6–2.2 |
| 3C434.1 | G94.0+1.0 |
| 3C461 | G111.7–2.1 |
| 4C–04.71 | G27.4+0.0 |
| 4C00.70 | G33.6+0.1 |
| (4C21.53) | G57.2+0.8 |
| 4C(T)55.38.1 | G93.3+6.9 |
| CTA 1 | G119.5+10.2 |
| CTB 1 | G116.9+0.2 |
| (CTB 33) | G337.0–0.1 |
| CTB 37A | G348.5+0.1 |
| CTB 37B | G348.7+0.3 |
| CTB 80 | G69.0+2.7 |
| CTB 87 | G74.9+1.2 |
| CTB 104A | G93.7–0.2 |
| CTB 109 | G109.1–1.0 |
| Cassiopeia A | G111.7–2.1 |
| Crab Nebula | G184.6–5.8 |
| Cygnus Loop | G74.0–8.5 |
| DA 495 | G65.7+1.2 |
| DA 530 | G93.3+6.9 |
| DA 551 | G93.7–0.2 |
| DR4 | G78.2+2.1 |
| HB3 | G132.7+1.3 |
| HB9 | G160.9+2.6 |
| HB21 | G89.0+4.7 |
| HC13 | G33.6+0.1 |
| HC24 | G39.2–0.3 |
| (HC30) | G46.8–0.3 |
| (HC40) | G54.4–0.3 |
| IC443 | G189.1+3.0 |
| Kepler | G4.5+6.8 |
| Kes 17 | G304.6+0.1 |
| Kes 20A | G310.6–0.3 |
| Kes 20B | G310.8–0.4 |
| Kes 27 | G327.4+0.4 |
| Kes 32 | G332.4+0.1 |
| Kes 40 | G337.3+1.0 |
| Kes 41 | G337.8–0.1 |
| Kes 67 | G18.8+0.3 |
| Kes 69 | G21.8–0.6 |
| Kes 75 | G29.7–0.3 |
| Kes 78 | G32.8–0.1 |
| Kes 79 | G33.6+0.1 |
| Lupus Loop | G330.0+15.0 |
| MSH 08–*44* | G260.4–3.4 |
| MSH 10–5*3* | G284.3–1.8 |
| MSH 11–5*4* | G292.0+1.8 |
| MSH 11–6*1*A | G290.1–0.8 |
| (MSH 11–6*2*) | G291.0–0.1 |
| (MSH 14–57) | G316.3–0.0 |
| MSH 14–6*3* | G315.4–2.3 |
| MSH 15–5*2* | G320.4–1.2 |
| MSH 15–5*6* | G326.3–1.8 |
| (MSH 15–57) | G328.4+0.2 |
| MSH 16–5*1* | G332.4+0.1 |
| MSH 17–3*9* | G357.7–0.1 |
| Milne 56 | G5.4–1.2 |
| Monoceros Nebula | G205.5+0.5 |
| NRAO 593 | G39.2–0.3 |
| NRAO 611 | G53.6–2.2 |
| OA 184 | G166.2+2.5 |
| PKS 0607+17 | G192.8–1.1 |
| PKS 0646+06 | G206.9+2.3 |
| PKS 1209–51/52 | G296.5+10.0 |
| PKS 1459–41 | G327.6+14.6 |
| Puppis A | G260.4–3.4 |
| R5 | G127.1+0.5 |
| RCW 86 | G315.4–2.3 |
| RCW 89 | G320.4–1.2 |
| RCW 103 | G332.4–0.4 |
| RCW 114 | G343.0–6.0 |
| S147 | G180.0–1.7 |
| SN1006 | G327.6+14.6 |
| SN1054 | G184.6–5.8 |
| SN1181 | G130.7+3.1 |
| SN1572 | G120.1+1.4 |
| SN1604 | G4.5+6.8 |
| SS433 | G39.7–2.0 |
| Sgr A East | G0.0+0.0 |
| Tycho | G120.1+1.4 |
| Vela (XYZ) | G263.9–3.3 |
| VRO 42.05.01 | G166.0+4.3 |
| W28 | G6.4–0.1 |
| (W30) | G8.7–0.1 |
| W41 | G23.3–0.3 |
| W44 | G34.7–0.4 |
| W49B | G43.3–0.2 |
| W50 | G39.7–2.0 |
| (W51) | G49.2–0.7 |
| W63 | G82.2+5.3 |

**Journals**

| | |
|---|---|
| AcASn | Acta Astronomica Sinica |
| A&A | Astronomy & Astrophysics |
| A&AS | Astronomy & Astrophysics Supplement |
| AJ | Astronomical Journal |
| AN | Astronomische Nachrichten |
| ApJ | Astrophysical Journal |
| ApJS | Astrophysical Journal Supplement |
| AuJPh | Australian Journal of Physics |
| AuJPA | Australian Journal of Physics Astrophysical Supplement |
| JApA | Journal of Astrophysics & Astronomy |
| JRASC | Journal of the Royal Astronomical Society of Canada |
| MNRAS | Monthly Notices of the Royal Astronomical Society |
| Natur | Nature |
| PASAu | Proceedings of the Astronomical Society of Australia |
| PASJ | Publications of the Astronomical Society of Japan |
| PASP | Publications of the Astronomical Society of the Pacific |
| RMxAA | Revista Mexicana de Astronomía y Astrofísica |
| Sci | Science |
| SvAL | Soviet Astronomy Letters |

**Proceedings**

SNRISM is *'Supernova Remnants and the Interstellar Medium'* (IAU Colloquium 101), eds Roger R.S. & Landecker T.L., (Cambridge University Press), 1988.

NSSR is *'Neutron Statrs in Supernova Remnants'* (ASP Conference Series, Volume 271), eds Slane P.O. & Gaensler B.M., (Astronomical Society of the Pacific: San Fransico), 2002.

**Radio Telescopes**

| | |
|---|---|
| 5km | Cambridge 5-km Telescope |
| 6C | Cambridge low frequency northern survey |
| ATCA | Australia Telescope Compact Array |
| BIMA | Berkeley–Illinois–Maryland Array |
| CLFST | Cambridge Low Frequency Synthesis Telescope |
| DRAO | Dominion Radio Astrophysical Observatory |
| FIRST | Fleurs Synthesis Telescope |
| MOST | Molonglo Observatory Synthesis Telescope |
| NRAO | National Radio Astronomy Observatory |
| NRO | Nobeyama Radio Observatory |
| TPT | Clark Lake TPT telescope |
| VLA | Very Large Array |
| VRO | Vermillion River Observatory |
| WSRT | Westerbork Synthesis Radio Telescope |

**Satellites**

| | |
|---|---|
| HST | Hubble Space Telescope |
| ISO | Infrared Space Observatory |

X-ray:

| | |
|---|---|
| ASCA | Advanced Satellite for Cosmology and Astrophysics |
| EXOSAT | European X-ray Observatory Satellite |
| ROSAT | Röntgensatellit |
| XMM | X-ray Multi-Mirror |