Supernova Remnant Candidates in the ROSAT All-Sky Survey

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Abstract: Identified radio supernova remnants (SNRs) in the Galaxy comprise an incomplete sample of the SNR population due to various selection effects. ROSAT performed the first All-Sky Survey (RASS) with an imaging X-ray telescope and thus provided another window for finding SNRs and compact objects that may reside within them. Meanwhile, 14 new SNRs were identified in multi-wavelength identification campaigns based on this RASS data (cf. Prinz & Becker 2012 for a summary) . The current list of RASS SNR candidates still includes 73 sources. All candidates have a diameter of $> 5'$, are located at a low Galactic latitude ($|\mathbf{b}| < 15$ deg) and have a signal-to-noise ratio greater than 4σ. Of these sources, 46 have an diameter of less than 30′, 10 between 30′ - 60′, 4 between 60′ - 120′, and 13 are larger than 120′.

eROSITA, which is supposed to be launched at the end of 2014 will provide a survey sensitivity of more than 10 times of what was available in the RASS. It supports to continue the previous SNR identification campaign and to search for new supernova remnants and pulsars with a much higher sensitivity than was possible before.

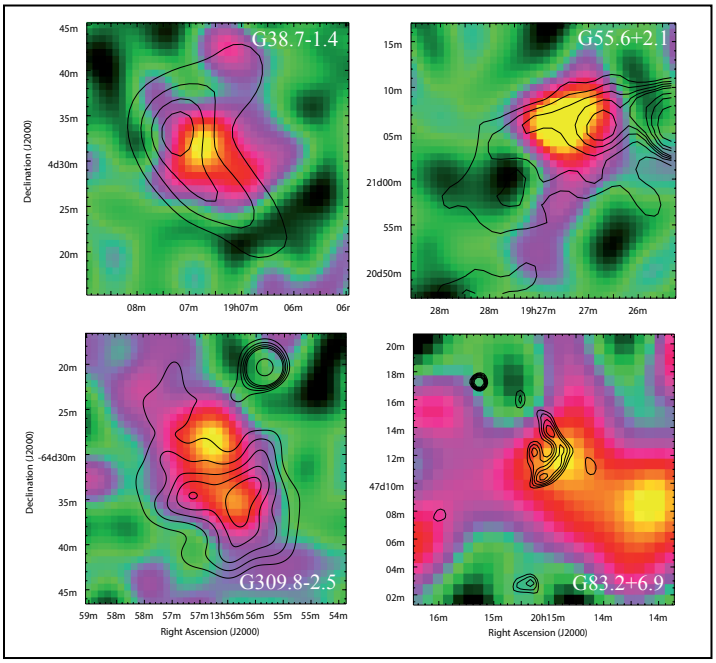

Figure 1: RASS images of SNR candidates with a good positional match between X-ray and radio emission:

G38.7–1.4 shows X-ray emission with an extent of 13’x10’. Radio data show a strong radio shell. With an Effelsberg follow-up observation at 6 cm a radio spectral index of -0.65 is determined. The radio emission is polarized, all in strong favour towards a SNR interpretation

G55.6+2.1 depicts X-ray emission with an extent of 13’x12’. Radio emission from the Parkes-MIT-NRAO (PMN) survey and infrared emission matches perfectly the shape of the X-ray source.

G309.8-2.5 reveals X-ray emission in the RASS with an extent of 18’x12’. The Molonglo sky survey (SUMSS) shows a bright radio shell.

G83.2+6.9 shows X-ray emission with an extent of 6’x6’. In the NRAO VLA Sky Survey (NVSS) an incomplete radio shell can be seen. With Effelsberg data taken in a follow-up observation, a spectral index of approximately -0.9 is deduced. The radio data are not polarized.

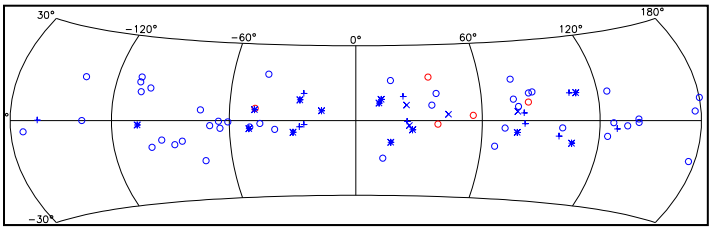

Figure 2: The location of the 73 RASS supernova remnant candidates in Galactic coordinates. Sources with an extent of less than 30 arc minutes are indicated by (○). (+) indicates SNR candidates with an extent of 30 – 60 arc minutes, (X) with an extent of 60 – 120 arc minutes and sources with an extent greater than 120 arc minutes are indicated by (*).

References and related publications:

• Prinz, T., Becker, W., Supernova Remnant Candidates in the ROSAT All-Sky Survey, 2013, submitted to A&A
• Prinz, T., Becker, W., Exploring the supernova remnant G308.4-1.4, 2012, A&A, 544, 7
• Prinz, T., Becker, W., The Supernova Remnant G296.7-0.9 in X-rays, 2013, A&A, 550, 33
• Schaudel, D., Becker, W., Voges, W., et al., Galactic SNR candidates in the ROSAT all-sky survey, 2002, arXiv:astro-ph/0208346v1

Collaborators are welcome,

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