



Astrophysics > Galaxy Astrophysics

# A Sino-German $\lambda 6\text{ cm}$ polarization survey of the Galactic plane VI. Discovery of supernova remnants G178.2-4.2 and G25.1-2.3

X. Y. Gao, X. H. Sun, J. L. Han, W. Reich, P. Reich, R. Wielebinski

(Submitted on 4 Jul 2011)

Supernova remnants (SNRs) were often discovered in radio surveys of the Galactic plane. Because of the surface-brightness limit of previous surveys, more faint or confused SNRs await discovery. The Sino-German  $\lambda 6\text{ cm}$  Galactic plane survey is a sensitive survey with the potential to detect new low surface-brightness SNRs. We want to identify new SNRs from the  $\lambda 6\text{ cm}$  survey map of the Galactic plane. We searched for new shell-like objects in the  $\lambda 6\text{ cm}$  survey maps, and studied their radio emission, polarization, and spectra using the  $\lambda 6\text{ cm}$  maps together with the  $\lambda 11\text{ cm}$  and  $\lambda 21\text{ cm}$  Effelsberg observations. Extended polarized objects with non-thermal spectra were identified as SNRs. We have discovered two new, large, faint SNRs, G178.2-4.2 and G25.1-2.3, both of which show shell structure. G178.2-4.2 has a size of 72 arcmin x 62 arcmin with strongly polarized emission being detected along its northern shell. The spectrum of G178.2-4.2 is non-thermal, with an integrated spectral index of  $\alpha = -0.48 \pm 0.13$ . Its surface brightness is  $\Sigma_{1\text{ GHz}} = 7.2 \times 10^{-23} \text{ W m}^{-2} \text{ Hz}^{-1} \text{ sr}^{-1}$ , which makes G178.2-4.2 the second faintest known Galactic SNR. G25.1-2.3 is revealed by its strong southern shell which has a size of 80 arcmin x 30 arcmin. It has a non-thermal radio spectrum with a spectral index of  $\alpha = -0.49 \pm 0.13$ . Two new large shell-type SNRs have been detected at  $\lambda 6\text{ cm}$  in an area of 2200  $\text{deg}^2$  along the the Galactic plane. This demonstrates that more large and faint SNRs exist, but are very difficult to detect.

Comments: 8 pages, 8 figures, accepted by Astronomy and Astrophysics. For the version with high resolution figures, please go to [this http URL](#)

Subjects: **Galaxy Astrophysics (astro-ph.GA)**; High Energy Astrophysical Phenomena (astro-ph.HE)

Cite as: [arXiv:1107.0564 \[astro-ph.GA\]](#)  
(or [arXiv:1107.0564v1 \[astro-ph.GA\]](#) for this version)

## Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

## Current browse context:

astro-ph.GA

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

## Change to browse by:

[astro-ph](#)

[astro-ph.HE](#)

## References & Citations

- [INSPIRE HEP](#)  
([refers to](#) | [cited by](#))
- [NASA ADS](#)

## Bookmark (what is this?)



From: Xuyang Gao [[view email](#)]

[v1] Mon, 4 Jul 2011 08:56:24 GMT (6867kb)

*[Which authors of this paper are endorsers?](#)*

Link back to: [arXiv](#), [form interface](#), [contact](#).