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The Sino-German λ6cm polarization survey of the Galactic plane

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After Prof. R. Wielebinski visited China in 1999, we started to plan the Sino-German λ6 cm polarization survey of the Galactic plane, using the Urumqi 25-m radio telescope of Xinjiang (formerly Urumqi) Astronomical Observatory, Chinese Academy of Sciences. It is a high-frequency complement of previous Effelsberg 21-cm and 11-cm surveys, using the same observing and processing methods. The telescope is located at an altitude of 2029 m above sea level at geographic longitude of 87°E and latitude 43°N. The dual-channel λ6 cm receiver with a polarimeter and a bandwidth of 600 MHz was designed by O. Lochner and constructed at the MPIfR in Germany with involvements by the Urumqi engineers M.Z. Chen and J. Ma. In August 2004, the receiver was installed at the secondary focus of the Urumqi 25-m telescope.

We surveyed the polarized emission of the Galactic plane from $10^\circ \leqslant l \leqslant 230^\circ$ in Galactic longitude and $|b| \leqslant 5^\circ$ in Galactic latitude, scanning section by section with a $9.5'$ beam and observing the calibrator sources 3C286 and 3C295 before and after each scan section. The observations took more than 4000 hours in 5 years until April 2009, sometimes only a few tens of hours in a month. Four former PhD students (X.H. Sun – even a few years after his PhD, W.B. Shi, L. Xiao, X.Y. Gao) have been heavily involved in observations and data processing, and a few other PhD students (H. Shi, C. Wang and J.W. Xu *et al.*) were involved in observations and studies of some individual objects. All survey data have been properly processed (Sun *et al.* 2007, Gao *et al.* 2010, Sun *et al.* 2011a, Xiao *et al.* 2011) and released at http://zmtt.bao.ac.cn/6cm/ and http://www.mpifr.de/survey.html. The sensitivity is about 1 mK in total power and 0.5 mK in polarization. The instrumental polarization is below 1%.

It is a 10 years work with long-term support from the Xinjiang Observatory. The new 6-cm polarization data not only reveal new properties of the diffuse magnetized interstellar medium (Gao *et al.* 2010, Sun *et al.* 2011a, Xiao *et al.* 2011), but are also very useful for studying individual objects such as HII regions, which may act as Faraday screens with strong regular magnetic fields inside, and for determining the flux densities at λ6 cm and radio spectra of supernova remnants (Gao *et al.* 2011a, Sun *et al.* 2011b). The high sensitivity of the survey enabled us to discover two large ($\sim 1^o$) SNRs G178.2−4.2 and G25.3−2.1 (Gao *et al.* 2011b).

References

Gao, X. Y., Reich, W., Han, J. L., *et al.* 2010, *A&A* 515, A64
Gao, X. Y., Han, J. L., Reich, W., Reich, P., Sun, X. H., & Xiao, L. 2011a, *A&A* 529, A159
Gao, X. Y., Sun, X. H., Han, J. L., Reich, W., Reich, P., & Wielebinski, R. 2011b, *A&A* 532, A144
Sun, X. H., Han, J. L., Reich, W., *et al.* 2007, *A&A* 463, 993
Sun, X. H., Reich, W., Han, J. L., *et al.* 2011a, *A&A* 527, A74
Sun, X. H., Reich, P., Reich, W., Xiao, L., Gao, X. Y., & Han, J. L. 2011b, *A&A* 536, A83
Xiao, L., Han, J. L., Reich, W., *et al.* 2011, *A&A* 529, A15