GALACTIC FINE STRUCTURE AT 843 MHZ

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1. Introduction

The Southern Galactic Plane surveyed by the Molonglo Observatory Synthesis Telescope (MOST) gives an unprecedented view of fine-scale structure in low frequency radio continuum emission over the area $245° \leq l \leq 355°, | b | \leq 1.5°$. The telescope operates at 843 MHz with a resolution of $43''$ and a sensitivity of approximately 2 mJy/beam for the sample region ($5° \times 3°$), centred on G317.5+0.0, presented here to illustrate significant features in the sources. This is a mosaic of 35 fields, each representing a 12 hr observation.

2. Results and Discussion

Recent work (Whiteoak 1992) has shown that thermal sources are significant 60μm infrared emitters whereas 843 MHz nonthermal sources emit weakly. Thus the ratio of 60μm to 843 MHz flux densities allows the physical origin of emission from Galactic features to be determined, a crucial step to explaining the evolution of the observed complex structures. Fig. 1 shows a grey-scale MOST image (resolution $43'' \times 43''\text{cosec}(\delta)$) overlaid by contours of the corresponding 60μm IRAS image, with a resolution of $\sim 4'$. Both images are dominated by the bright H II region, G316.8-0.1. Significant differences between the two images reveal the distribution of nonthermal sources, both Galactic and extragalactic. Statistically, it is probable that most of the isolated unresolved nonthermal sources are background galaxies. From Whiteoak and Green (1994) this region contains four published SNRs (G315.4-0.3, G315.9-0.0, G316.3-0.0, G318.9+0.4), two new SNR identifications found with the MOST (G317.3-0.2, G318.2+0.1), and two tentative MOST SNR possibilities (G317.5+0.9, G319.9-0.7).

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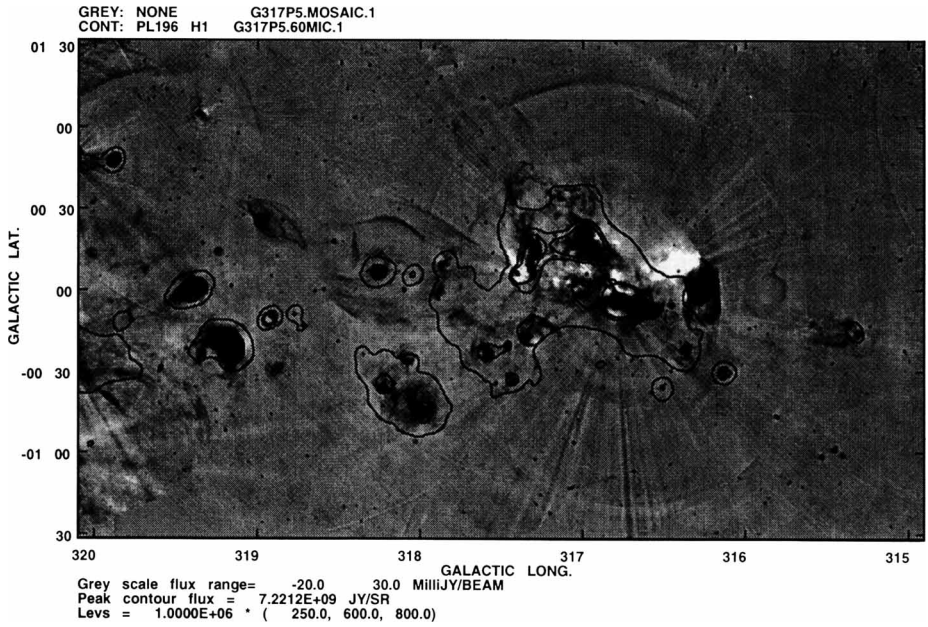

Figure 1. Grey-scale MOST image, overlaid by contours of 60μm IRAS image.

The dynamics and three-dimensional distribution of non-stellar objects in the Milky Way and how they contribute to the interstellar medium (ISM) is not well understood. The extended H II regions in the image show fibrous emission down to the sensitivity limit of the observations, while the SNRs have narrow filaments and sharp boundaries. Nevertheless, the local external environment is the dominant factor in SNR evolution, swamping any initial uniformity which might be expected from massive stars exploding. Since both SNRs and H II regions are formed by young massive stars it is surprising that their distributions are not better correlated, although different lifetimes and poor distance information for most SNRs may distort the results. The area shown has several SNRs apparently surrounding an H II complex, suggesting outward motion from a central association or propagating star formation. Observations at other frequencies are needed to elucidate the significance of the structure seen in the MOST images.

References

Whiteoak, J.B.Z. (1992) *Astron. Astrophys.*, 262, 251
Whiteoak, J.B.Z. and Green, A.J. (1994) in preparation