# RADIO POLARIMETRY OF TYCHO'S SNR

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The remnant of Tycho's supernova of 1572 has been polarimetrically imaged using the 4 configurations of the VLA at wavelengths of 22 and 6 cm. A few data were also obtained at wavelengths of 21, 19, and 18 cm in the B configuration to check for any ambiguities in the Faraday rotation measurements and to look for deviations from the $\lambda^2$ dependence of the Faraday rotation which would indicate significant internal Faraday effects. Although the total intensity shows structure on a scale of about 1 arcsecond the polarized emission appears to be resolved into cells of perhaps 10-arcsec size (1 arcsec corresponds to 0.011 pc at the 2.2 kpc distance to Tycho's SNR). We have therefore convolved the map shown in Figure 1 to a resolution of 4 arcsec to improve the signal-to-noise ratio. The contours represent the total intensity at 6-cm wavelength and the vectors show the position angle of the magnetic field with a length corresponding to the polarized intensity at 6 cm. In order to be seen, the vectors have a separation of 6 arcsec but no significant information is lost on this spacing.

The results clearly show a net radial orientation of the magnetic field all the way to the very edge of the source but the fractional polarization within a "cell" of polarized vectors is typically about 0.07. There are too few cells along the line of sight, particularly near the outer edge, to cause the apparent low polarization by superposition of random cells and the cells are large enough compared to our beam so we do not see beam depolarization. Therefore, there must be internal turbulence on a micro scale much smaller than 1 arcsec. The mean Faraday rotation toward the remnant is about 240 rad/m$^2$ but there is no apparent deviation from the $\lambda^2$ law or correlation with the x-ray emission which indicates the density of thermal electrons. Also, the depolarization ratio between 20 and 6 cm is about 0.6. We conclude that there is very small internal Faraday rotation.



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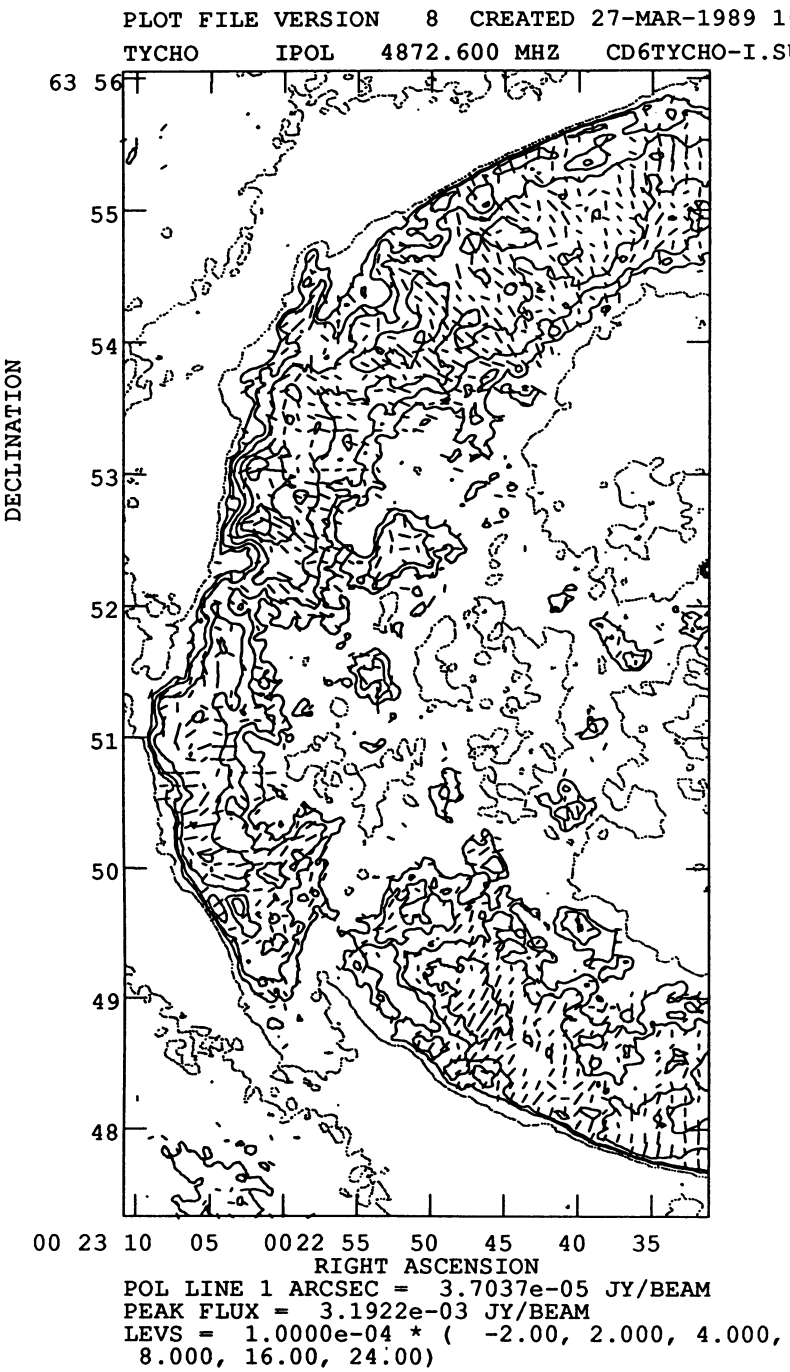


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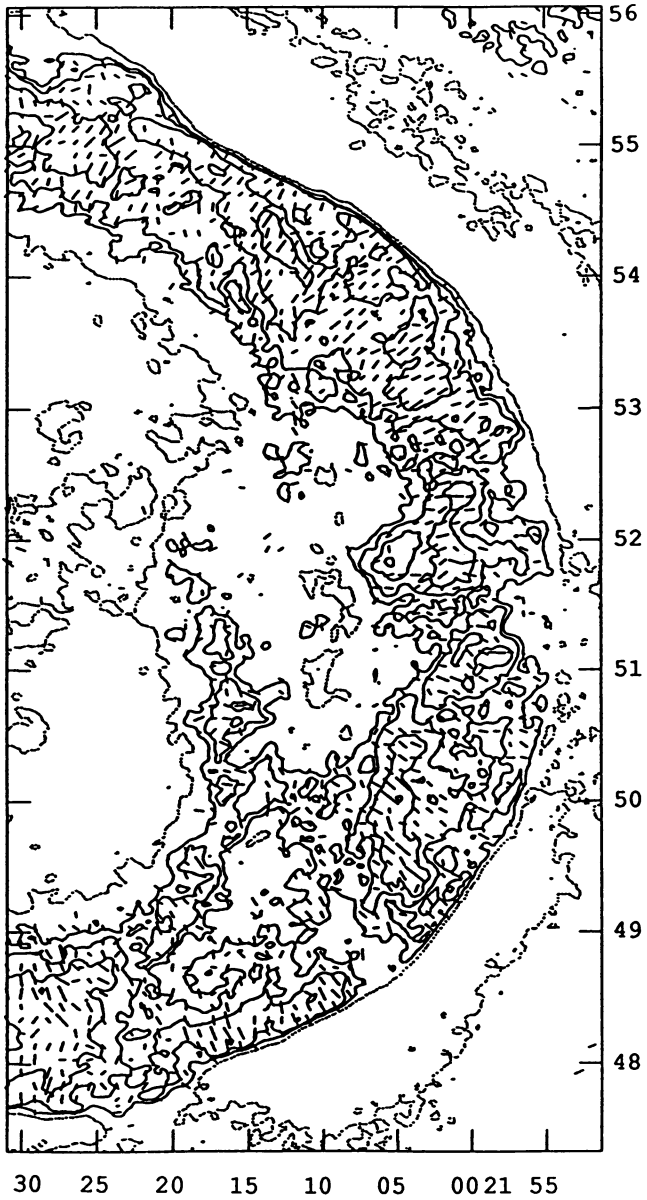


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