

2.3 GHz RADIO EMISSION FROM Sco OB2

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INTRODUCTION: The Sco OB2 Association is convenient for investigation as it has a high galactic latitude and is therefore remote from the confusion of the galactic plane. Its distance is accurately known and this permits fairly precise estimates to be made of the Lyman continuum photon fluxes responsible for the radio emission. It includes the ρ Ophiuci dark cloud where star formation is occurring.

OBSERVATIONS: The survey was carried out using the 26 m telescope of the Hartebeesthoek Radio Astronomy Observatory. At an operating frequency of 2.295 GHz the telescope has a beamwidth of 20' and the receiver has a system temperature of 26 K. The fullbeam brightness temperature is given by $T_b = (1.43) \times (\text{antenna temperature})$.

The area surveyed extended from R.A. (1950) = 15 h 43 m to 16 h 40 m and Dec (1950) = -15 to -30 degrees. Background scans were made on cold sky so as to subtract the atmosphere and ground contributions. The declination scans were tied together by drift scans at ten declinations.

The data were smoothed by transforming to the spatial frequency domain. The Galactic disc has associated with it diffuse continuum radiation which varies slowly at latitudes of about $b = 20$ degrees. This contribution was subtracted to emphasize the local structure. A contour map of the smoothed data after subtraction of the galactic contribution is plotted in the figure. The rms noise temperature is about 10 mK. The lowest contour is 80 mK and the contour interval is 20 mK. Stars of types B0 to B5 are shown by dots and B6 to B9 by crosses.

- (a) An extended radio source coincides with the stars of the Association.
- (b) Local enhancements in radio emission are detectable for stars earlier than B2.
- (c) The H II region, RCW 129, around τ Sco is density bounded.
- (d) Lyman fluxes deduced from radio fluxes for σ and π Sco are much larger than the predictions of recent models of B stars.
- (e) The Lyman flux deduced from the radio flux of the whole association is larger than the sum predicted for all the stars if the radio flux is assumed to be of thermal origin.
- (f) The early B type stars, the strong radio emission, the obscuration and an H I shell (Sancisi, 1974) tend to occur near the edges of the Association.

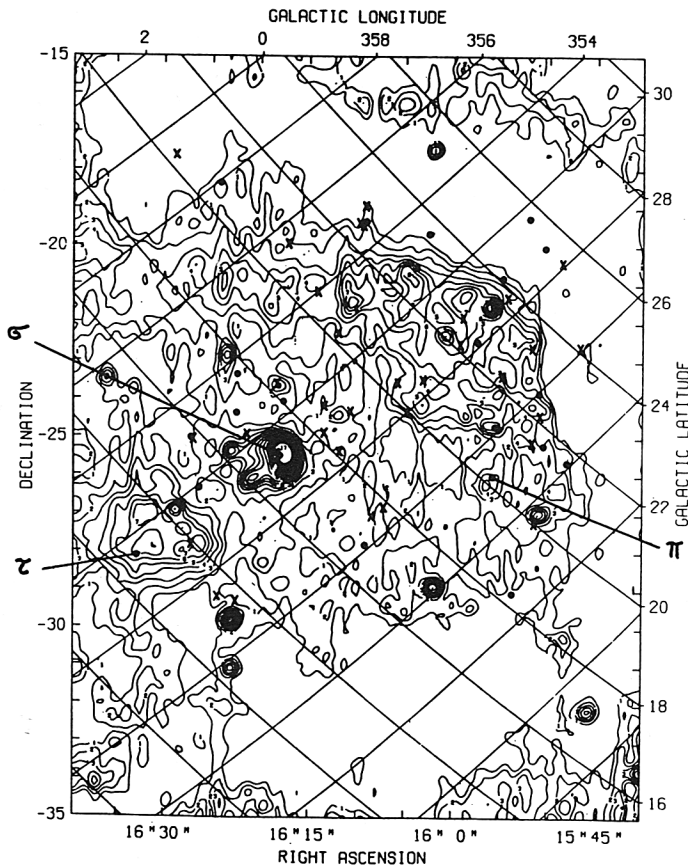


Figure 1. The Sco OB2 contour map.