THE GALACTIC DISTRIBUTION OF MASSIVE STARS EMBEDDED IN MOLECULAR CLOUDS

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ABSTRACT. Observations of the CS J = 2 → 1 line have been made with SEST toward IRAS point sources associated with the largest molecular cloud complexes in the southern Milky Way. A total of 294 embedded stellar objects have been detected and their distribution in the Galaxy derived.

With completion of our CO Survey of the fourth Galactic quadrant it became possible to establish the gross distribution of molecular gas in the Galaxy over a large fraction of the area within the solar circle (Bronfman et al. 1988, 1989). At least half of the interstellar gas in the inner disk is molecular; most of it is in the form of large clouds that, particularly in the vicinity of spiral arms, are often arranged into large complexes.

Many of the major complexes identified seem to be associated with hot infrared point sources which, according to their FIR colors, are likely to be compact HII regions heated by embedded OB stars (Wood and Churchwell 1989); the association, however, is uncertain because several molecular clouds may be found in the line of sight toward a given IRAS point source. We have now observed with SEST the CS J = 2 → 1 line, a high density tracer, toward embedded star candidates in the third and fourth Galactic quadrant , detecting 294 of them and determining their parent molecular clouds.

Using the kinematic information contained in the CS observations we have derived the Galactocentric radial distribution of massive stars. In the inner Galaxy they concentrate in a ring 3 kpc wide (FWHM) at a mean radius of 5.5 kpc, coincident, although somewhat narrower, with the mean radial distribution derived from CO data. A secondary maximum, corresponding to the Carina Spiral Arm, is found in the outer Galaxy.

REFERENCES

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