AN INTERFEROMETRIC OBSERVATION OF THE NGC 7538 MOLECULAR CLOUD CORE

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A high-spatial-resolution observation of the NGC 7538 molecular cloud core has been performed with the Nobeyama Millimeter Array. We report on the detailed structure of the region including IRS1-3 complex and IRS11 based on the CS J=1-0 line observational results.

The observation was done in December, 1988. The field center was at R.A. (1950)=23h11m36 .8s, Dec(1950)=61°11'10" which is between IRS1-3 complex and IRS11. The primary beam, 2.5'(FWHM), was large enough to cover both IRS1-3 complex and IRS11. We used 18 baselines, and the synthesized beam became 10.6"x10.4" (natural weight).

We have found five high-density regions (>10^4 cm^{-3}). One of them has a maximum at the H20 maser/continuum source near IRS11. This result suggests that star formation activity occurs at the position of the H20 maser/continuum source (Kameya et al. 1990). The CO bipolar outflow near IRS11 (Kameya et al. 1989) originates the CS peak position. On the other hand, IRS11 itself is not at the peak and it seems to stay in the blue lobe of the CO outflow. Therefore IRS11 itself is probably an infrared reflection nebula which is in a cavity in a blue lobe of the bipolar molecular outflow originating at the H20 maser/continuum source.

On the other hand, the CS emission does not have a maximum at IRS1-3 complex. The CS J=1-0 structure at IRS1-3 complex is different from that of CS J=2-1 (Kawabe et al. 1992): there is no shell like structure. This may be because the optical depth of CS J=1-0 is too large to make a contrast of CS J=1-0 intensity, and the central high-density region (n(H2)>10^4 cm^{-3}) is probably hidden in the medium density region (n(H2) is about 10^2 cm^{-3}).

References