

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 ( $>10^4 \text{ cm}^{-3}$ ). One  
of them has a maximum at the H<sub>2</sub>O maser/continuum source near  
IRS11. This result suggests that star formation activity  
occurs at the position of the H<sub>2</sub>O 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 hands, 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 H<sub>2</sub>O maser/continuum source.

On the other hand, the CS emission dose 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 because  
the optical depth of CS J=1-0 is too large to make a  
contract of CS J=1-0 intensity, and the central high-density  
region ( $n(\text{H}_2) > 10^5 \text{ cm}^{-3}$ ) is probably hidden in the medium  
density region ( $n(\text{H}_2)$  is about  $10^4 \text{ cm}^{-3}$ ).

References

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