

CO OBSERVATIONS OF HIGH-VELOCITY FLOWS IN THE CORE OF THE NGC 7538 MOLECULAR CLOUD

Osamu Kameya, Tatsuhiko Hasegawa, Naomi Hirano, Keiya Takakubo
Astronomical Institute, Faculty of Science, Tohoku University,
Sendai, Japan

and

Munezo Seki

College of General Education, Tohoku University, Sendai, Japan

ABSTRACT. Observation of the high-velocity flows in the core region of the NGC7538 molecular cloud are carried out with CO (J=1-0) molecular line using NRO 45-m radio telescope. The beam size is 14" and the mapping area covers about 4'×3'. Four high-velocity flows are found in the core region. The high-velocity flows are prominent at and around IRS1, 9, and 11.

Their characteristics are as follows.

(1) IRS1 region: A clear bipolar pattern is present along NW-SE line. The flow size is 1.2'×1.1' (1.0pc×0.9pc at the distance of 2.7 kpc). These characteristics are consistent to the results of other observations (Fisher et al. 1985; Scoville et al. 1986). The entire region of the flow is accerelated.

(2) IRS9 region: The scale of the high-velocity flow is about 2'×2' (1.6pc×1.6pc) and indicates a large high-velocity flow. While the structure of the flow is complicated, it has a tendency that the blue wing mainly exists south of IRS9, and the red one exist north of it, indicating nearly bipolar distribution. Shell structures are found for bluer and redder parts. Especially the shell of the bluer part bracket the reflection nebulae around IRS9 (Werner et al.1980). These structures suggest that this flow resembles a bipolar flow source at R Mon which is associated with reflection nebula (Cantó et al. 1981) and that the axis of the flows is very close to the line of sight.

(3) IRS11 region: High-velocity wings are most prominent in our observed area at the restricted velocity range from -65 kms^{-1} to -60 kms^{-1} (LSR velocity). This probably indicate that a massive gas around IRS11 moves with not so high velocity relative to the ambient gas ($V_{\text{LSR}} \sim 57 \text{ kms}^{-1}$). Equi-velocity maps indicates that this high-velocity flow is a bipolar flow centered at IRS11. This flow is the same as the CS high-velocity flow near IRS11 most prominent in the core (Kameya et al. 1986).

This work was carried out under the common use observation program at the Nobeyama Radio Observatory (NRO).

(4) Region around position A (see Figure 1): Both blue and red wings are seen west of position A, which is 40" southeast of IRS11, and south of IRS11 but do not show any bipolarity. Since this region is contaminated by the flow around IRS11, the real structure and nature of this flow are still not certain. Many infrared sources have been found in this region.

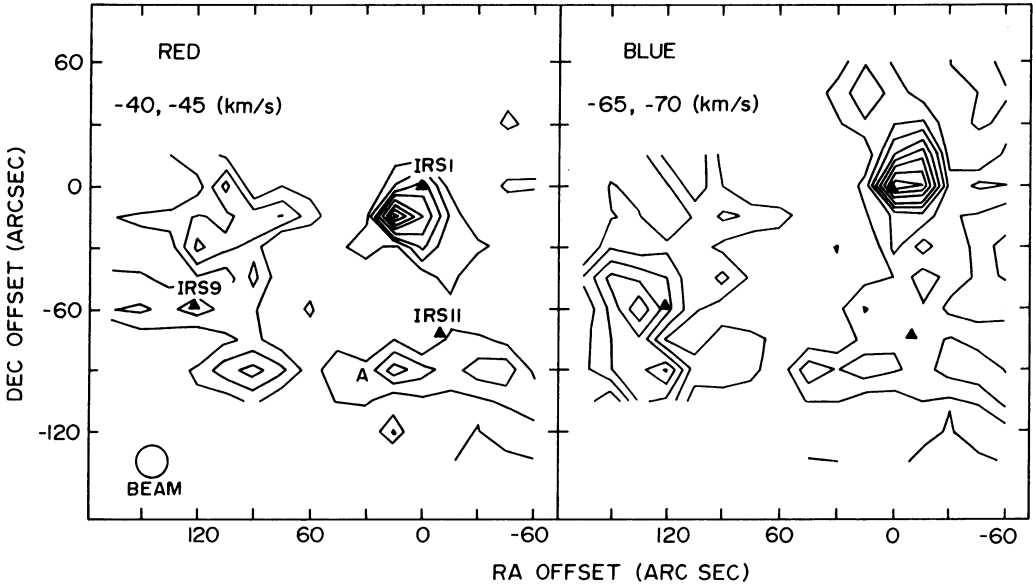


Figure 1. Maps of integrated intensity in blue- and red-shifted high-velocity component. The blue one and the red one are integrated from -70 km s^{-1} to -65 km s^{-1} and from -45 km s^{-1} to -40 km s^{-1} , respectively. Contour levels are 1, 2, ..., $K \text{ km s}^{-1}$. The position (0', 0') is at IRS1 ($\alpha(1950)=23^{\text{h}}11^{\text{m}}36^{\text{s}}.8$, $\delta(1950)=61^{\circ}11'48.0''$).

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