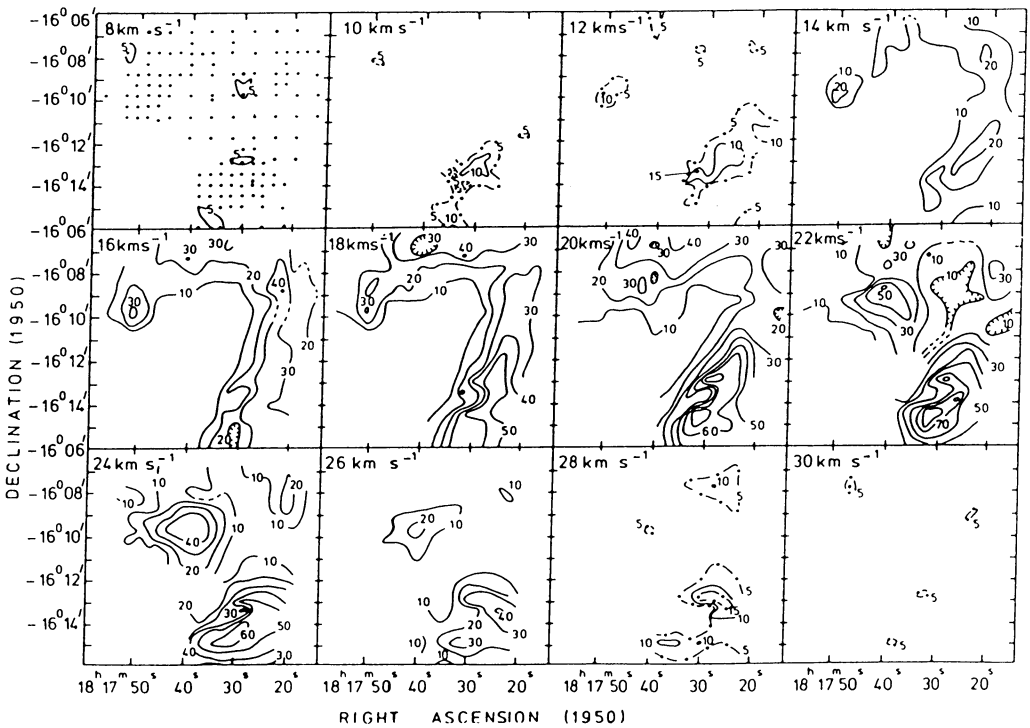


# MOLECULAR LINE OBSERVATIONS IN Sgr B2

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## 1. OBSERVATIONS

The ∿20 pc square region around the continuum peak ($\alpha(1950.0) = 17^h44^m 10.6^s$, $\delta(1950.0) = -28°22'05''$) of Sgr B2 was observed using the 45-m telescope of Nobeyama Radio Observatory. The observed molecules are $H_2O$, $NH_3$, $CH_3OH$, SiO, $H^{13}CN$, $H^{13}CO^+$, CO, HNCO, $HC_3N$, and so on.

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## 2. GENERAL TENDENCY

The line emission is weak near the continuum peak and the strong emission is distributed around the H II region. Peak radial velocities are, in many cases, $\sim$50 km $s^{-1}$ in the south and $\sim$75 km $s^{-1}$ in the north. The line profiles from different molecules, for example HNCO and $HC_3N$, differ from each other from place to place. We suggest it to be due to the differences in chemical composition and/or excitation conditions among molecules (See Figure 1).

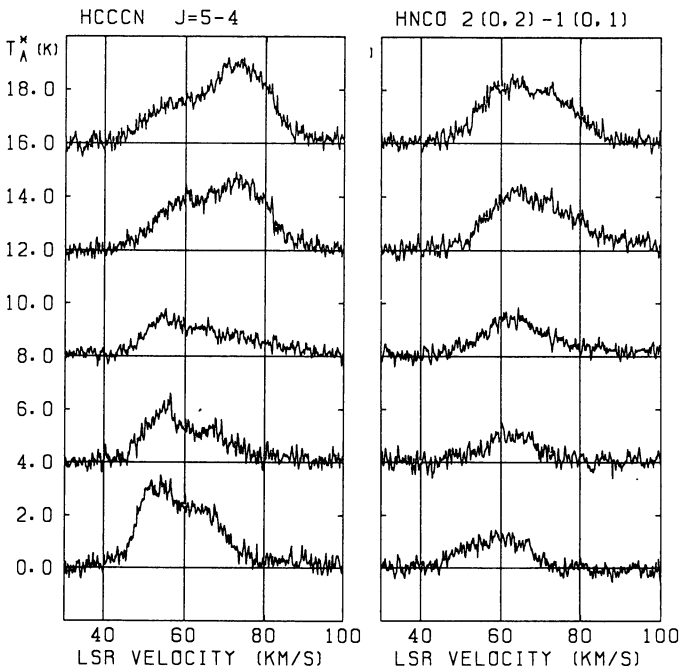


Fig. 1. Sample profiles of $HC_3N$ (left) and HNCO (right) lines. In each case five profiles, taken at 60"N, 30"N, 0", 30"S, 60"S of the center, are arranged from top to bottom. Note that the lines are weak near the center and that the two molecules show different profiles.

## 3. DISCOVERY OF METHANOL MASERS

We discovered three new maser lines; the $4_{-1}-3_0$ E, the $5_{-1}-4_0$ E and the $7_0-6_1$ $A^+$ transitions of $CH_3OH$. In addition to components with narrow linewidth and small size (typical of known maser lines) the E transitions have components which are: (i) extended, (ii) distributed along the edge of the H II region and (iii) of large line widths (Figure 2).

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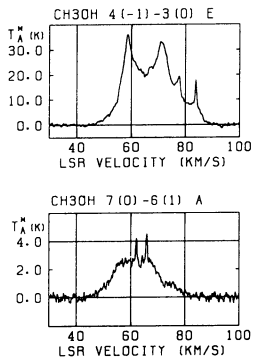


Fig. 2. Examples of maser emission profiles of $4_1$-$3_0$E and $7_0$-$6_1$A$^+$ lines of $CH_3OH$.

The fractional abundance of methanol to molecular hydrogen ($CH_3OH/H_2$) required to cause maser action is estimated to be $\sim 10^{-7}$. Such a high abundance may be provided by evaporation from dust surfaces.

## THE Sgr B2 REGION SEEN AT 43 GHz

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The Sgr B2 region was mapped at 43 GHz ($\lambda$ = 6.9 mm) with the 45m radio telescope of Nobeyama Radio Observatory. The observing parameters were: a) half power beamwidth 38", b) pointing accuracy better than 10", c) central frequency 43.0 GHz, d) bandwidth 500 MHz, and e) system noise temperature 400 K; and the observational aspects were: a) mapping with one polarization, b) liquid-nitrogen cooled load switching and c) reduction by NOD-2 programme.The obtained map is shown in Figure 1. Sgr B2 is resolved into several components which correspond to those by Martin and Downes (1972) and Downes *et al.* (1978). But the component at RA = $17^h44^m11.8^s$ Dec. = -28°23'55" at 1950 is not seen in Martin and Downes (1972) nor in the 5 GHz map of Downes *et al.* (1978), although the feature is seen in the 10.7 GHz map of Downes *et al.* (1978). The components derived from the map in Figure 1 by a morphological estimate are listed in Table 1. The total flux density of the region is 146J±30 Jy. The intensity calibration was made by observing NGC 7027.

A comparison was made with the 10.7 GHz results by Downes *et al.* (1978) obtained with the Bonn 100-m radiotelescope. As the spatial rerolution of the 10.7 GHz results is 1.3', the 43 GHz map was convolved

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