# SIO MASER SOURCES IN THE GALACTIC BULGE AND A KINEMATIC SIGNATURE OF THE BAR STRUCTURE

S. DEGUCHI
*Nobeyama Radio Observatory*
*Minamimaki, Minamisaku, Nagano 384-13, Japan*

**Abstract.** We are studying the kinematic structure of our Galaxy by detecting SiO maser lines around 43 GHz with the Nobeyama 45-m telescope. Till today, about 500 IRAS sources (AGB stars) in the central region of the Galaxy are observed and the radial velocities of about 300 detected sources are obtained. The longitude-velocity map of SiO sources clearly shows a presence of forbidden regions (holes) which are located at the same positions of HI and CO holes. The presence of holes is interpreted as a streaming motions of stars due to a bar structure of the Galactic bulge

## 1. Introduction

A high sensitivity of the Nobeyama 45-m telescope at about 43 GHz (by the SiO J=1-0, v=1 and 2 transitions) allows us to detect AGB stars at distances of 8-15 kpc in our Galaxy (Nakada et al. 1993). SiO masers are emitted in circumstellar envelopes of late-type stars with high mass-loss rates (e. g., see Shiki, Ohishi, & Deguchi 1997; Deguchi, et al. 1997) and the radial velocity of SiO lines coincides well with the stellar velocity (Jiang et al. 1995), which is measured from double peaks of the OH 1612 MHz line (e. g., Winnberg 1996). SiO surveys of the bulge IRAS sources ($|b| > 3°$) have already been published and the main results are summarized in Izumiura et al. (1995). We have started a new project of surveying IRAS sources in $|b| < 3°$ from this year. Members of this SiO maser survey group are myself, H.Izumiura, N. Ukita, Y. Nakada, O. Kameya, S. Matsumoto, T. Fujii, and T. Ootsubo. Infrared observations are also made in collaborations with members of South African Astronomical Observatory and Mt. Stromlo and Siding Spring Observatories.



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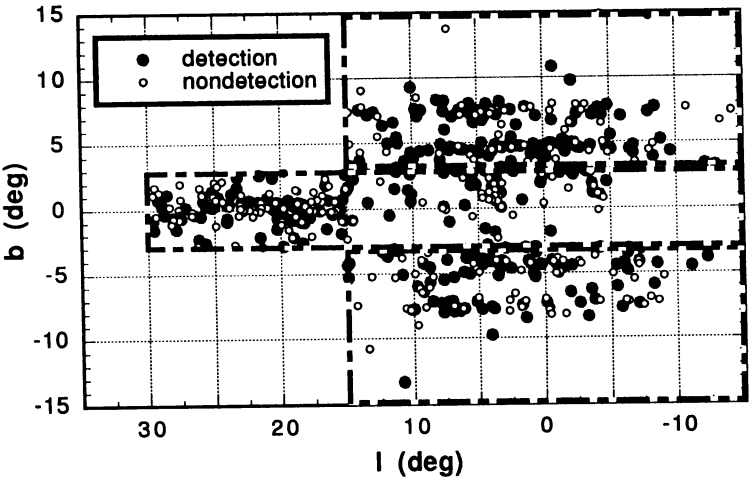


Fig. 1. The sky plot of IRAS sources observed with Nobeyama 45-m telescope by SiO maser lines.

## 2. SiO observations and the first year result

Figure 1 shows a sky plot of the observed stars. The number of stars observed in this year ($|b| < 3°$) was 220 and we got 134 detections. The selection criteria of IRAS sources are very similar to the previous bulge survey except that the IRAS color range is slightly narrower ($0 < log(F_{12}/F_{25}) < 0.1$). The criteria preferentially pick up the late-type stars with dust shell of about 300 K at distances between a few kpc and 15 kpc. The survey area chosen was in the region of $-10° < l < 30°$ and $|b| < 3°$. In this year, we have devoted to area at the top of the bar structure, $-15° < l < 25°$.

The velocity-longitude diagram of 134 detected stars in $-10° < l < 30°$ shows that the following characteristics; (1) a large concentration of stars are found at $V_{lsr} = 20 - -100$ km s$^{-1}$ and $15 < l < 20°$, (2) some holes of maser sources are found at the same positions of holes in the CO l-v diagram, and (3) some stars deviate from the limiting velocities of CO. These characteristics can be interpreted by the streaming motion of stars in the bar-like potential of the Galaxy.

## References

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