OBSERVATIONAL PROPERTIES OF SIO MASERS IN THE GALACTIC BULGE IRAS SOURCES

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We surveyed 313 color-selected IRAS sources in the Bulge in the SiO J=1-0 (v=1,2) lines with the Nobeyama 45m telescope, which resulted in 222 detections (Nakada et al. 1992; Izumiura et al. 1994ab). The detection rates exceeded 80% for the brighter samples (Table 1). We discuss the observed SiO maser characteristics and the implications of the obtained l-v diagram.

SiO Maser Intensity: We examined the integrated SiO intensity against the 12μm flux density. On average, our sample stars show much stronger SiO intensities for a particular 12μm flux than found by Jewell et al. (1991) for stars in the solar neighborhood. The highest observed value of the SiO intensity for a fixed 12μm flux is 10 times as high as theirs. This large discrepancy should be confirmed with future observations of the nearby stars with the 45m telescope.

Completeness of our survey: In terms of 12μm flux, our survey is almost complete down to $F_{12} \sim 1.5$ Jy in the $|b| = 7°$-$8°$ strips. According to Whitelock et al. (1991) our survey reached the far side of the Bulge, as far as 4 kpc away from the galactic center. Our sample, however, may be biased to the intrinsically brighter objects in the far-side. In the $|b| = 4°$-$5°$ strips the sampling is complete down to $F_{12} = 3$ Jy, which means that our survey is almost complete in the near side of the Bulge (see Nakada et al. 1991). The far side has also been substantially sampled as far as 10 kpc from the Sun. In addition, these arguments are valid for the region of $l > -8°$ due to the declination limit at Nobeyama.

Implications of the l-v diagram: Izumiura et al. (1993) suggested a possible asymmetry in the l-v diagram. It has turned out to come mostly from sources in the 7°-8° strips in quadrant "A" of Figure 1. The 4°-5° strips sources are distributed rather symmetrically around the origin in the diagram, in spite of the somewhat smaller distance coverage. The asymmetry

L. Blitz and P. Teuben (eds.), Unsolved Problems of the Milky Way, 341–342.

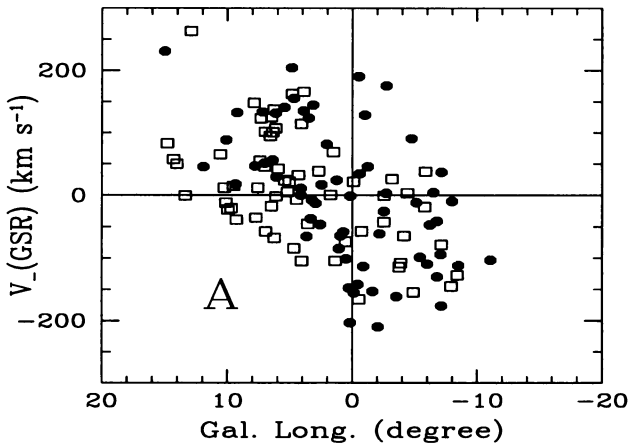

Figure 1. l-v diagram for the 4°-5° (filled circles) and 7°-8° (open squares) strips. All the sources which have a F_{12} less than 10 Jy are plotted.

is probably not due to the sampling effect but real. This suggests that either the 7°-8° strips have a significantly different velocity structure than the 4°-5° strips, or the 4°-5° strips will show a similar feature if the sampling becomes deeper. We might be seeing an extra kinematical component which becomes evident only away from the plane.

TABLE 1. Detection Rate (%) ($N_{detected}/N_{observed}$)

Color Range	Flux Range (Jy)			
$\log(F_{25}/F_{12})$	1.0-2.0	2.0-4.0	4.0-8.0	8.0-16.0
−0.10-0.00	56 (5/9)	67 (6/9)	78 (7/9)	67 (10/15)
0.00-0.10	52 (11/21)	65 (31/48)	79 (52/66)	88 (23/26)
−0.15-0.15	57 (24/42)	66 (44/67)	73 (74/101)	81 (43/53)

References

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