

A survey of molecular clouds in the outer Galaxy with the highest spatial resolution

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Abstract. We report a recent result of the FUGIN project, a Galactic plane CO survey using the Nobeyama 45-m Telescope and the FOREST receiver. In the third galactic quadrant, 42 square degrees are observed and 4752 molecular clouds are detected. Among them, 12 clouds are located at R (distance from the Galactic center) > 16 kpc. Molecular clouds at $R < 16$ kpc trace the Local, Perseus, and Outer arms.

Keywords. ISM: clouds, ISM: molecules, Galaxy: disk, Galaxy: structure, radio lines: ISM

1. FUGIN project and the third galactic quadrant survey

We have carried out a simultaneous survey of the $J = 1-0$ transitions in ^{12}CO , ^{13}CO , and C^{18}O toward the Galactic Plane using the Nobeyama 45-m Telescope and the FOREST (FOur-beam REceiver System on the 45-m Telescope, Minamidani *et al.* 2016b.) as one of the legacy projects of the Nobeyama Radio Observatory. The FOREST Ultra-wide Galactic plane survey In Nobeyama (FUGIN, Umemoto *et al.* in prep., Minamidani *et al.* 2016a, Nishimura *et al.* 2015) project covers the areas of $l = 10 - 50$ and $198 - 236$ degree for $b = -1 - +1$ degree with the highest spatial resolution ($\sim 15''$) to date, for this kind of wide-area Galactic surveys and so far, 90 square degrees have been covered.

The observed area in the third galactic quadrant is 42 square degrees. Figure 1 shows the longitude velocity diagram of the ^{12}CO $J = 1-0$ transition. We identified 4752 molecular clouds above 5 sigma noise level using CLUMPFIND algorithm. We found that 12 clouds were located at $R > 16$ kpc and molecular clouds at $R < 16$ kpc traced the Local, Perseus, and Outer arms. Clouds in $R > 16$ kpc are obviously compact in contrast with clouds within $R < 16$ kpc.

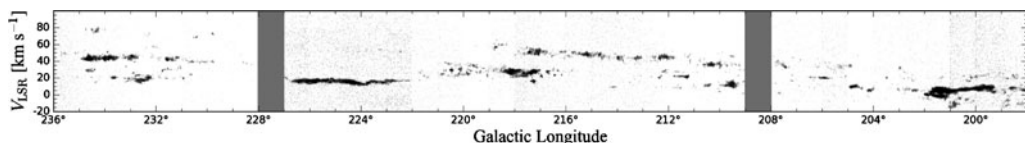


Figure 1. Longitude velocity diagram of the ^{12}CO $J = 1-0$ transition. Grey background areas have not been observed yet.

References

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