A LARGE-SCALE CO IMAGING OF THE GALACTIC CENTER

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1. Introduction and Observations

Molecular gas in the Galactic center region is spatially and kinematically complex, and its physical conditions are distinctively different from those of molecular gas in the Galactic disk (*e.g.*, Morris 1996). Relative paucity of current star formation activity, despite the abundance of dense molecular gas in this region, is one of the problem at issue.

Using the 2×2 multi-beam SIS receiver at the NRO 45m telescope (beamwidth $16''$), we have made CO high resolution mapping observations of the Galactic center region. We have collected about 44,000 ^{12}CO (J=1–0) spectra and over 13,000 ^{13}CO (J=1–0) spectra with $34''$ grid spacing. The ^{12}CO data cover almost the full extent of the Galactic center molecular cloud complex.

2. Morphology and Kinematics

Our CO images with extremely wide spatial dynamic range provide innovative view of the molecular gas in the Galactic center region (Oka *et al.* 1996, Hasegawa *et al.* 1996).

- Enormous number of molecular arcs and/or shells.
- Sharp emission edges and filamentary structures.
- An high velocity expanding molecular ring ($d \sim 50$pc) near the center.
- A molecular "smoke" originated from the central 10 parsecs.
- Large molecular flare at $l \simeq 1.3°$ consisting of many filaments.

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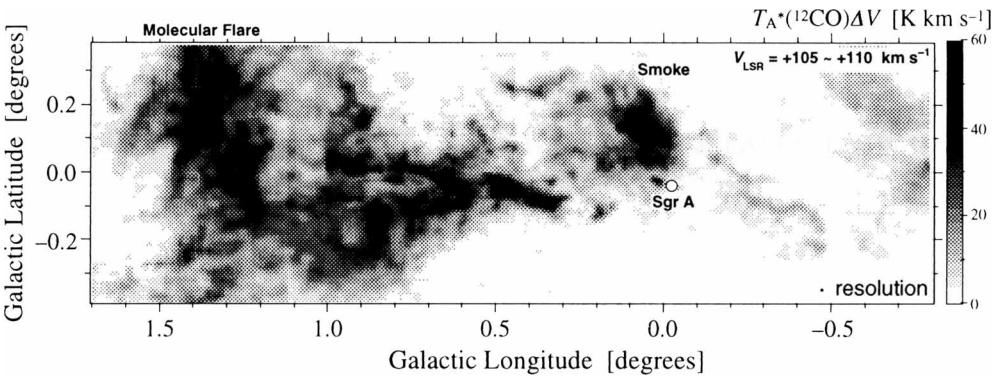

Figure 1. A gray-scale image of ^{12}CO (J=1–0) emission in the velocity range V_{LSR}=+105 to +110 km s^{-1}. Molecular flare at $l \simeq 1.3°$ is associated with a number of molecular shells/arcs.

The morphology and kinematics of molecular gas strongly suggest that there are enormous number of supernova remnants in the Galactic center region, and that the region has experienced an era of active star formation in the recent past. A burst of star formation with a short duration time will have peak in the mechanical energy released as superwind about 5×10^7 years after a starburst (Heckman *et al.* 1993). The Galactic center may be currently in a "wind dominated" phase with quiescent star formation after a starburst.

The central region of the Galaxy may have been experienced recurrent bursts of star formation. A concentration of AGB stars in the central 100 pc (Lindqvist *et al.* 1991) could be remnants of ancient starbursts.

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