

Evidences of infalling gas onto the circumnuclear ring at the galactic center from SiO and H¹³CO⁺ emission lines observation

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The central region of our Galaxy (Sgr A⁺) is the nearest galactic center harboring a massive black hole [1,2]. The environment around Sgr A⁺ is a topic of interest to diverse fields. We are interested in gas feeding from giant molecular clouds (GMC) within 10 pc of the Galactic center to the Circumnuclear Ring/Disk (CND), which is presumable "lay-down bay" of infalling gas toward Sgr A⁺ [3]. In order to reveal the mechanism, we observed the CND and its surroundings in SiO and H¹³CO⁺ lines using Nobeyama Millimeter Array (NMA). We depict the CND clearly in both lines and some molecular streamers to the CND in only SiO line including one new detection. The line intensity ratios at overlapping points of streamers with the CND are higher ($I(\text{SiO})/I(\text{H}^{13}\text{CO}^+) > 6$) than the average of CND (2-4). This is a strong evidence indicating these streamers are connecting to the CND. Some components at the outer region of the CND are also detected in both lines. We also estimate the rotation velocity of the CND as $110 \pm 10 \text{ km s}^{-1}$ and of just a bit outside from the CND as $93 \pm 14 \text{ km s}^{-1}$. The estimation of the rotation velocity in the distance range of 5-10 pc from the Sgr A⁺ has a great meaning since there have been few report about the kinematic parameters at just outside of the CND [3,4 and 5].

References

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