Observations of the $^{13}CO/C^{18}O$ isotope ratios toward the Galactic Center

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Isotope ratios are one of the most powerful probes for chemical evolution of space. Generally, isotope ratios are measured *via* abundances of isotope molecules. To investigate chemical evolution of molecular clouds, isotopic species of CO are representative tracers due to its ubiquitousness and richness. However, ratios of $^{13}CO/CO$ and $C^{18}O/CO$ are difficult to measure because of optical thickness of CO. Thus, a ratio of $^{13}CO/C^{18}O$ is an effective probe. For the Galactic Center region, the ratio was reported to be 10–15 by using FCRAO 14 m radio telescope in 1986 [1]. In this work, we observed intensities of emission lines of the J = 1–0 transition of CO toward Sgr B2(N) using Nobeyama 45 m Radio Telescope to measure the isotopic ratios precisely. The observational position of $\Delta\alpha = 57''$ and $\Delta\delta = -5.6''$ from the Sgr B2(N) core was used to prevent overlapping with absorption lines, and then only emission lines were detected. The isotope ratios were derived to be 5.9–17.5 toward Galactic Center. As a result, we found that the ratios in this work can be comparable with that of the previous work [1].

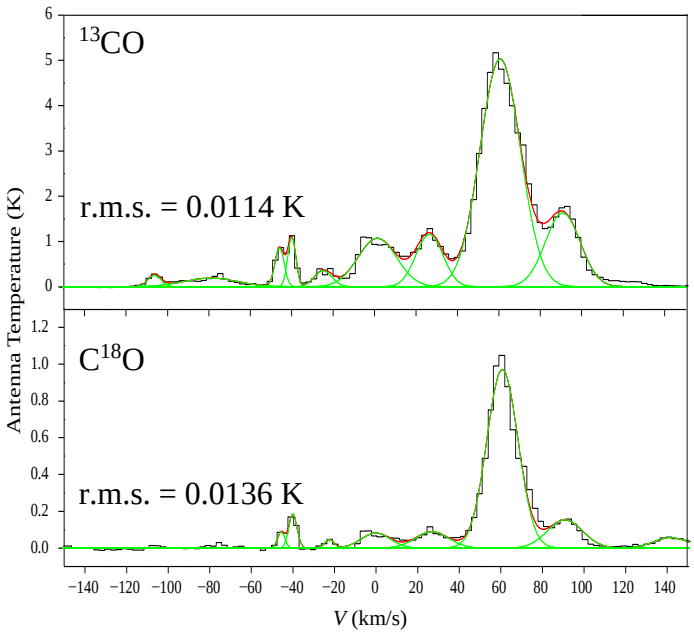

Table 1. Isotope Ratios of Individual Components

	V (km/s)	$^{13}CO/C^{18}O$
3kpc expanding ring	−46	12.6 ± 7.8
	−40	5.9 ± 2.6
	−24	15.0 ± 9.3
Galactic center	0	17.5 ± 3.9
Scutum/Crux arm	25	10.5 ± 2.2
Galactic center SgrB2(M)	61	6.4 ± 0.1
unassigned	91	10.6 ± 0.9

Figure 1: Observed J = 1−0 rotational transitions of ^{13}CO and $C^{18}O$. The green lines show individual velocity components, and the red line is a sum of them.

Reference

[1] D. K. Taylor & R. L. Dickman, 1986, BAAS 18, 1026.