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CO and its Isotopomers Observation towards Sgr B2

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Abstract. We present our observations toward Sgr B2 region in $J = 1-0$ lines of ^{12}CO, ^{13}CO, C^{18}O and C^{17}O using 13.7-m Delingha millimeter telescope with newly installed 9-beam SIS superconducting receiver. From the integrated line intensity, we derive the abundance ratio of C^{18}O/C^{17}O with a mean value of 3.11 ± 0.10, which is consistent with the previous results.

Key words. Sgr B2: C^{18}O: C^{17}O.

1. Introduction

Gas kinematics of the galactic centre region (GC) show that gas in the halo flow inside towards the disk and gas in the outskirts of the disk fall further towards GC (e.g., Fukui *et al.* 2006; Binney *et al.* 1991; Rodriguez-Fernandez & Combes 2008). Isotope ratios are considered to be a good tool to discriminate between gas flowing towards the disk and gas already residing in the disk of the central galactic plane (Riquelme *et al.* 2010). A systematic study is performed on isotope abundance ratio of ^{18}O to ^{17}O of the galaxy (using C^{18}O and C^{17}O: similar chemical and excitation properties and both tend to be optically thin). Here ^{12}CO, ^{13}CO, C^{18}O and C^{17}O ($J = 1-0$) observations toward Sgr B2 region are presented.

2. Observation

The ^{12}CO, ^{13}CO, C^{18}O and C^{17}O ($J = 1-0$) were mapped recently for Sgr B2 ($10'*10'$, 2011.1.16 and 26) using the PMO 13.7-m telescope with the newly installed 9-beam SIS superconducting receiver. The central position is $l = 0°.680$, $b = -0°.060$.

3. Analysis and discussion

3.1 *Average spectra and integrated intensity contours*

The average ^{12}CO, ^{13}CO, C^{18}O and C^{17}O ($J = 1-0$) spectra are shown in Fig. 1(a) and the averaged range is $l = -5'$ to $+5'$, $b = -5'$ to $+5'$ around our observational

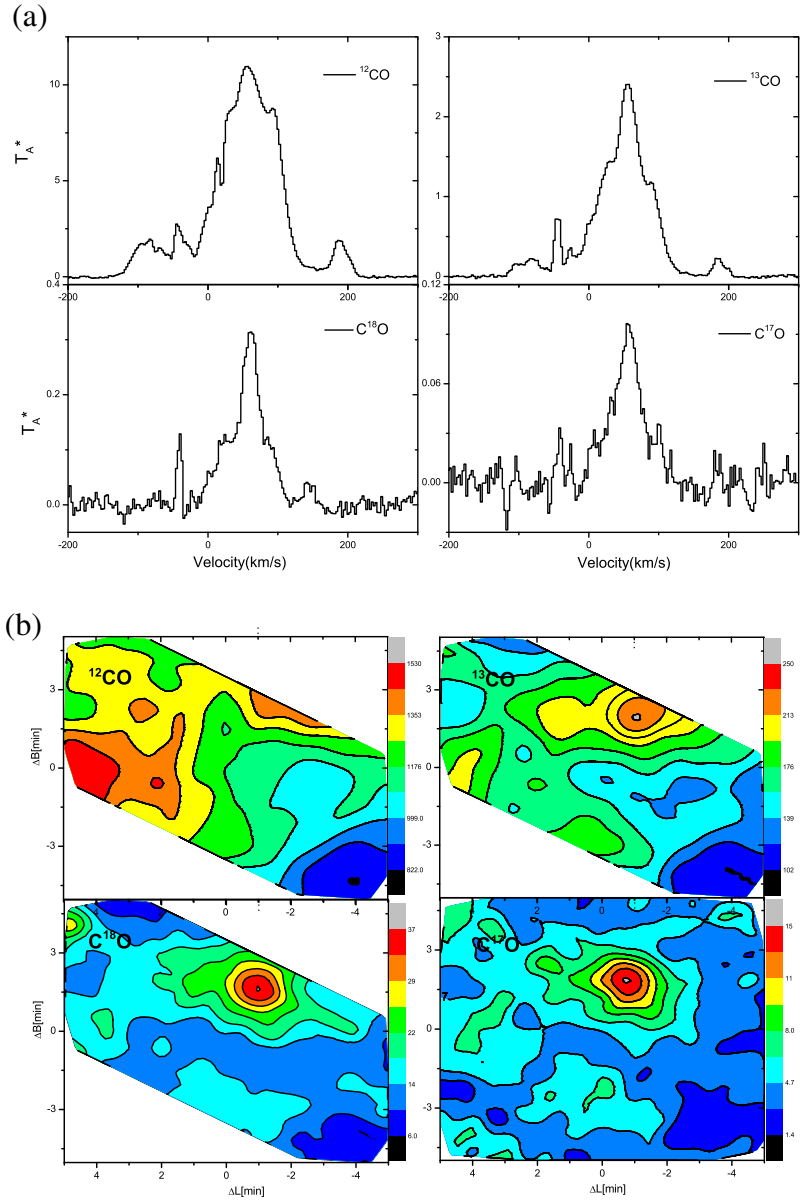

Figure 1. (**a**) Average ^{12}CO, ^{13}CO, C^{18}O and C^{17}O ($J = 1-0$, $10'*10'$) spectra. (**b**) Integrated intensity contours (Vp $\approx$ 55 km/s, velocity ranges from its S/N > 3).

centre. The integrated intensity contours are shown in Fig. 1(b). The main velocity component (Vp $\approx$ 55 km/s) was analysed and the integrated velocity ranges are based on S/N > 3. From contours, we can see that ^{13}CO, C^{18}O and C^{17}O have nearly the same intensity centre: $l \approx 0°.663$, $b \approx -0°.027$, while ^{12}CO is different because of its complicated spectra.

3.2 $^{18}O/^{17}O$ isotopic ratios

The integrated intensity ratios are derived from these positions (33 positions): (1) The same velocity component for both lines; (2) Both lines have strong signal with S/N>5. Our measured $^{18}O/^{17}O$ (frequency-corrected) is 3.11 ± 0.10, which is consistent with the previous result (e.g., Wouterloot *et al.* 2008). Effects on isotopic ratio $^{18}O/^{17}O$, such as opacity, fractionation, selective photo-dissociation etc., need further discussions.

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