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**NRO Star Formation Legacy Project I. High abundance ratio of  $^{13}\text{CO}$  to  $\text{C}^{18}\text{O}$  toward photon-dominated regions in the Orion-A giant molecular cloud**

Yoshito Shimajiri (CEA/Saclay), Yoshimi Kitamura (JAXA), Masao Saito, Fumitaka Nakamura, Ryohei Kawabe (NAOJ), Munetake Momose, Takashi Tsukagoshi (Ibaraki Univ.), Kazuhito Dobashi, Tomomi Shimoikura, Akifumi Yamabi, Sho Katakura (Tokyo Gakugei Univ.), Hiroyuki Nishitani (NRO), Chihomi Hara (Univ. of Tokyo), and Tomohiro Tanaka (Osaka Prefecture Univ)

We have carried out observations with an angular resolution of 25.8 arcsec ( $\sim 0.05$  pc) in  $^{13}\text{CO}$  ( $J=1-0$ ) and  $\text{C}^{18}\text{O}$  ( $J=1-0$ ) toward the Orion-A giant molecular cloud using the Nobeyama 45m telescope to investigate the relationship between the far ultraviolet (FUV) radiation and the abundance ratios between  $^{13}\text{CO}$  and  $\text{C}^{18}\text{O}$ . The overall distributions and velocity structures of the  $^{13}\text{CO}$  and  $\text{C}^{18}\text{O}$  gas similar to those of the  $^{12}\text{CO}$  ( $J=1-0$ ) emission. The column densities of the  $^{13}\text{CO}$  and  $\text{C}^{18}\text{O}$  emission lines are estimated to be  $0.2 \times 10^{16} < N_{^{13}\text{CO}} < 3.7 \times 10^{17} \text{ cm}^{-2}$  and  $0.4 \times 10^{15} < N_{\text{C}^{18}\text{O}} < 3.5 \times 10^{16} \text{ cm}^{-2}$ , respectively. The abundance ratios,  $X_{^{13}\text{CO}}/X_{\text{C}^{18}\text{O}}$ , are found to be 5.7 – 33.0. The mean value of  $X_{^{13}\text{CO}}/X_{\text{C}^{18}\text{O}}$  in the nearly edge-on photon-dominated regions (PDRs) is found to be  $16.47 \pm 0.10$ , which is three times larger than the solar system value of 5.5. The mean value of  $X_{^{13}\text{CO}}/X_{\text{C}^{18}\text{O}}$  in the other regions is found to be  $12.29 \pm 0.02$ . The difference of the abundance ratio is most likely due to the selective FUV photodissociation of  $\text{C}^{18}\text{O}$ .