

Constraints on $^{12}\text{C}/^{13}\text{C}$ and $^{16}\text{O}/^{18}\text{O}$ Isotopic ratio in Neptune's atmosphere from ALMA observations of CO

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Abstract

We report the detection of CO, ^{13}CO , and upper limits of C^{18}O in Neptune's atmosphere with our ALMA observations. These measurements will allow us to constrain the $^{12}\text{C}/^{13}\text{C}$ and $^{16}\text{O}/^{18}\text{O}$ Isotopic ratio in Neptune's stratosphere.

Our observations -performed on April 23, 2016- used the ALMA interferometer to search in Neptune's atmosphere for CO(3-2), ^{13}CO (3-2) and C^{18}O (3-2) rotational lines at 345.796, 330.588, and 329.330 GHz, respectively. These measurements were obtained using about 41 antennas of the 12m array, despite the angular resolution of $\sim 0.6''$ and Neptune's angular surface diameter was $2.24''$, only disk-averaged measurements allowed to detect with sufficient signal-to-noise ratio the ^{13}CO line, while only upper limits of C^{18}O were obtained.

We will present the analysis of these observations, which will include i) the vertical profile of CO, ii) the isotopic ratio of $^{12}\text{C}/^{13}\text{C}$ and $^{16}\text{O}/^{18}\text{O}$ and finally discuss the origin of CO in Neptune's stratosphere.

1. Figures

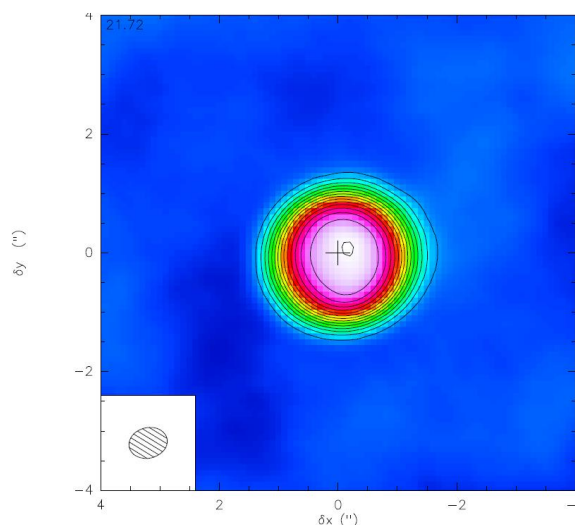


Figure 1: Continuum map of Titan at 330 GHz.

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