

Spatially Resolved Sub-millimeter Continuum Imaging of Neptune's Upper Troposphere with ALMA: a New Constraint on the Global Atmospheric Circulation

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In this presentation, we report the analysis result of Neptune's continuum emission obtained from the ALMA archive. Neptune's south pole has exhibited a brightness temperature excesses both by mid-IR and cm observations. To constraint whether the excesses are due to the hot air parcel heated by chemical processes or the adiabatic heating, or to the variation of the molecular opacities, we analysed a sub-mm continuum observation data obtained with ALMA in August 2012. The observation was carried out with 646 GHz center frequency and with 12 antennae. From the radiative transfer analysis considering CIA opacities of H₂ and He, it was concluded that the observation probes the upper troposphere mainly. No clear hot spot that exceeds 2.1 K in the brightness temperature scale was found out, whereas the mid-IR and cm excesses were as high as 7 to 30 K.

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