

Confirmation of the first detection of HNC on Titan

R. Moreno (1), E. Lellouch, (1), P. Hartogh (2), M.A. Gurwell (3), L.M. Lara (4), R. Courtin (1), M. Rengel (2), A. Moullet (3), C. Jarchow (2), D. Bockelée-Morvan, (1), N. Biver (1), D.C. Lis (5) and the HSSO team
(1) LESIA, Obs. Paris-Meudon, France, raphael.moreno@obspm.fr, (2) MPIS, Lindau, Germany, (3) Harvard-Smithsonian CfA, MA, USA, (4) IAA-CSIC, Granada, Spain, (5) Caltech, CA, USA

Abstract

Herschel/HIFI detection of HNC at 543.897 GHz on Titan in June 2010 were reported by [1]. In 2011, as part of the Herschel/HSSO key program [2], we have performed additional observations I) at 543.897 GHz with the HIFI heterodyne receiver onboard of the Herschel spatial observatory II) with the IRAM radiotelescope at 271.9 GHz, III) with the SMA interferometer at 362.6 GHz. Observations of HCN has been also performed at the same time that those of HNC. All these observations detected HNC, and therefore confirm the presence of HNC on Titan atmosphere.

A detailed study of the relative line intensities and FWHM is ongoing. With the combination of all these detected HNC rotational lines, we expect to constrain the vertical distribution of HNC and to derive the HNC/HCN ratio.

This analysis will be presented, as well as a comparison with vertical profiles expected from photochemical models.

1. HNC Line at 543 GHz

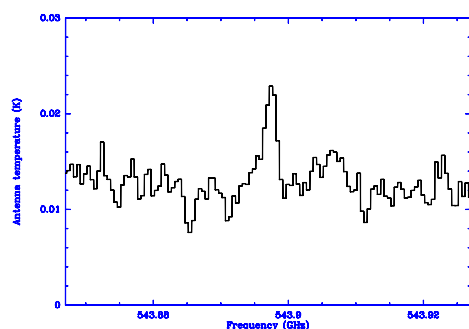


Figure 1: First detection of HNC on Titan's atmosphere with Herschel/HIFI on June 14, 2010.

Acknowledgements

Herschel is an ESA space observatory with science instruments provided by European-led Principal Investigator consortia and with important participation from NASA. HIFI has been designed and built by a consortium of institutes and university departments from across Europe, Canada and the United States under the leadership of SRON Netherlands Institute for Space Research, Groningen, The Netherlands and with major contributions from Germany, France and the US. IRAM is supported by INSU/CNRS (France), MPG (Germany) and IGN (Spain). The Submillimeter Array is a joint project between the Smithsonian Astrophysical Observatory and the Academia Sinica Institute of Astronomy and Astrophysics and is funded by the Smithsonian Institution and the Academia Sinica.

References

- [1] Moreno, R., Lellouch, E., Hartogh, P., Lara, L.M., Courtin, R., Rengel, M., Jarchow, C., Bockelée-Morvan, D., Biver, N., Lis, D. and the HssO Team : Herschel/HIFI Observations of Titan : Observation of the H₂O(110-101) 557 GHz Line and First Detection of HNC. BAAS, 42, 61.03, pp.1088, 2010
- [2] Hartogh, P., Lellouch, E., Crovisier, J., et al : Water and related chemistry in the solar system. A guaranteed time key programme for Herschel. Planet. Space Scie., 57, 1596-1606, 2009.