AOGS 2005

Titan's atmosphere from Cassini/CIRS observations

ATHENA COUSTENIS[1], BRUNO BÉZARD[1], MICHAEL FLASAR[2], VIRGIL KUNDE[2], GORDON BJORAKER[2], CONOR NIXON[2], BARNEY CONRATH[3], RICHARD ACHERBERG[4], EMMANUEL LELLOUCH[1], ANDRE MARTEN[1], REGIS COURTIN[1], THIERRY FOUCHET[1], DONALD JENNINGS[2], PAUL ROMANI[2], ROBERT SAMUELSON[2] and THE CIRS INVESTIGATION TEAM

[1]*LESIA, Paris-Meudon Obs., France*
[2]*NASA/GSFC, Greenbelt, MD, USA*
[3]*CRSR, Cornell University, USA*
[4]*SSAI, NASA/GSFC, USA*

We have analyzed data recorded by the Composite Infrared Spectrometer (CIRS) aboard the Cassini mission during the recent Titan fly-bys (October 2004- June 2005). The spectra characterize various regions on Titan from south to north pole and with various emission angles. We study the emission observed in the 3 CIRS detectors (covering roughly the 10-1500 cm-1 spectral range with a 0.53 cm-1 apodized resolution at best). The composite spectrum shows a large variety of molecular signatures: hydrocarbons, nitriles and 3 oxygen components. We have used a temperature profile retrieved by inversion of the emission observed in the methane ν4 band at 1304 cm^{-1} and a line-by-line radiative transfer code to infer the abundances of the trace constituents and their isotopes in Titan's stratosphere. We will compare these mixing ratios with values retrieved two Titan seasons ago by V1 and V2 IRIS observations, with more recent disk-averaged Infrared Space Observatory (ISO) results and with the latest Cassini-Huygens inferences from other instruments.

References

[1] Flasar, F. M., Achterberg R. K., Conrath B. J., Bjoraker G. L., Jennings D. E., Pearl J. C., Romani P. N., Simon-Miller A. A., Kunde V. G., Nixon, C. A., Bézard B., Orton G. S., Spilker L. J., Irwin P., Teanby, N. A., Spencer, J. A., Owen T. C., Brasunas J. C., Segura, M. E., Carlson, R., Matmoukine, A., Gierasch, P. J., Schinlder, P. J., Ferrari, C., Showalter, M. R., Barucci A., Courtin R., Coustenis A., Fouchet T., Gautier D., Lellouch E., Marten A., Prangé; R., strobel, D. F., Calcutt S. B., Read P. L., Taylor F. W., Bowles, N., Samuelson R. E., Abbas M. M., Raulin F., Ade P., Edgington, S., Pilorz, S., Wallis, B., Wishnow, E. 2005. Temperatures, winds, and composition in the Saturnian system. *Science*, published online 23 Dec. 2004, in press.