

Titan's Atmospheric Composition from Observations by the Cassini Infrared Spectrometer

M. M. Abbas (1), A. LeClair (1), F. M. Flasar (2), V. G. Kunde (2), B. J. Conrath (3), A. Coustenis (4), D. J. Jennings (2), C. A. Nixon (5), J. Brasunas (2), R. K. Achterberg (2), G. Bjoraker (2), G. Orton (6), and CIRS Team.

(1) NASA- Marshall Space Flight Center, Huntsville, AL 35812, USA, (2) NASA-Goddard Space Flight Center, Greenbelt, MD 20771, USA , (3) Department of Astronomy, Cornell University, Ithaca, NY 14853, USA, (4) LESIA, Obs. De Paris-Meudon, 5, place Jules, Moudon, 92195 France (5) Department of Astronomy, University of Maryland, College Park, MD USA (6) Jet Propulsion Laboratory, 4800 Oak Grove Dr., Pasadena, CA 91109, USA

The Composite Infrared Spectrometer (CIRS) aboard the Cassini spacecraft has been making observations during the fly-bys of Titan since the Saturn-Orbit-Insertion in July 2004. The observations provide infrared thermal emission spectra of Titan's atmosphere in three spectral channels covering the 10 cm^{-1} to 1400 cm^{-1} spectral region, with variable spectral resolutions of 0.53 cm^{-1} and 2.8 cm^{-1} . The uniquely observed spectra exhibit rotational and vibrational-rotational spectral lines of the molecular constituents of Titan's atmosphere that may be analyzed to retrieve information about the composition, thermal structure, and physical and dynamical processes in the remotely sensed atmosphere. We present an analysis of Titan's infrared spectra observed during July 2004 (T0), December 2004 (Tb) and February 2005 (T3), for retrieval of the stratospheric thermal structure, distribution of the hydrocarbons, nitriles, and oxygen bearing constituents, such as C_2H_2 , C_2H_4 , C_2H_6 , C_3H_8 , HCN , HC_3N , CO , and CO_2 . Preliminary results on the distribution and opacity of haze in Titan's atmosphere are discussed.