

Cassini UVIS/HDAC observations of Titan's exosphere during the T9 encounter

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Cassini UVIS/HDAC is a Lyman photometer with Hydrogen/Deuterium cells, which is designed to measure Deuterium (121.533 nm) and Hydrogen (121.567 nm) Lyman alpha emissions from Titan and Saturn. HDAC works as a very narrow absorption filter. The incident Lyman alpha emission is absorbed by hydrogen (deuterium) atoms from hydrogen (deuterium) molecules dissociated by a heated filament temperature. The strength of the cell absorption can be controlled by the power heating the filament. This and the variation of the Doppler velocity (near zero) allows us to deconvolute the profile of the incident Lyman alpha line and the D/H ratio in Titan.

A measurement sequence was performed with HDAC during the Cassini T9 encounter on Dec 26 2005. Here we focus on the data taken around the closest approach (17:52-19:18 (UTC)) During this period the distance between Titan and spacecraft changed from 30000 km to 13000 km. The phase angle changed 30-110 deg. Lyman alpha emission was detected at a brightness level of 500 ~700 [R]. The Doppler velocity changed from -4.7 km/sec to -5.0 km/sec. Line profile sweeping had succeeded.

We will show results from the T9 flyby and discuss the (1) D to H intensity ratio of Titan, (2) hydrogen distribution, and (3) line profile determination of Titan's hydrogen exosphere.