



New results from Cassini radio occultations of Titan's ionosphere

A. J. Kliore (1), A.F. Nagy (2), F.M. Flasar (3), P.J. Schinder (4), R.G. French (5), E.A. Marouf (6), N.J. Rappaport (1), A. Anabtawi (1)

(1) Jet Propulsion Laboratory, California Institute of Technology, USA, (2) University of Michigan, USA, (3) NASA Goddard Space Flight Center, USA, (4) Cornell University, USA,

(5) Wellesley College, USA, (6) San Jose State University, USA,

(akliore@jpl.nasa.gov)

We report results on Titan's ionosphere from the Cassini radio occultation of March 26, 2007 (T27), as well as those of March 19, 2006 (T12), and May 20, 2006 (T14). The 2006 occultations occurred at low Southern latitudes of 14.7S, 36.2S, 19.8S, and 21.9S. The 2007 occultation was nearly polar, at latitudes of 81S and 59N. The solar zenith angles for all occultations were near the terminator, ranging from 85 to 95 deg.

The ionosphere peak was observed to lie close to an altitude of 1200 km, and the observed peak densities ranged from about 1.2 to $2.0 \times 10^3 \text{ cm}^{-3}$, which is in fairly good agreement with other Cassini observations and the previous Voyager radio occultation results.

Radio occultation observations of the Titan ionosphere are difficult because of its low density and small size, and it was facilitated by the unprecedented Cassini radio science system, which has three frequencies that can operate simultaneously: S-band (2.3 GHz), X-band (8.4 GHz), and Ka-band (32 GHz). In particular, Ka-band has never been used before to probe Titan's ionosphere, and the signal-to-noise ratios at all frequencies of 42, 54, and 48 dB-Hz., respectively, have never before been achieved.