



Preliminary Interpretation of Titan Plasma Interaction as Observed by the Cassini Plasma Spectrometer: Comparisons With Voyager 1

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The Cassini Plasma Spectrometer (CAPS) instrument made measurements of Titan's plasma environment when the Cassini Orbiter flew through the moon's plasma wake October 26, 2004 (flyby TA) and December 13, 2004 (flyby TB). Preliminary CAPS ion and electron measurements from these encounters (1, 2) will be compared with measurements made by the Voyager I Plasma Science Instrument (PLS). The comparisons will be used to evaluate previous interpretations and predictions of the Titan plasma environment that have been made using PLS measurements (3, 4). The plasma wake trajectories of flybys TA, TB and Voyager 1 are similar because they occurred when Titan was near Saturn's local noon. These similarities make possible direct, meaningful comparisons between the various plasma wake measurements. The comparisons will focus on the composition and dynamical nature of the ambient plasma and pickup ions. Using the CAPS ion measurements, some of the questions to be addressed, as stimulated by previous interpretations and predictions made evaluating PLS data, are the following: A) Are H^+ , O^+ and/or N^+ the major ambient ion components of Saturn's rotating magnetosphere in the vicinity of Titan? B) Are finite gyro-radius effects apparent in ambient O^+ (and/or N^+) as the result of its interaction with Titan's atmosphere? C) Are the principal pickup ions composed of H^+ , H_2^+ , N^+ , N_2^+ and CH_4^+ ? D) Is there evidence of slowing down of the ambient plasma due to pickup ion mass loading; and, as the ionopause is approached are heavier pickup ions becom-

ing dominant such as N_2^+ ? E) What are the similarities and differences between the magnitudes and structures of the electron densities and temperatures along the three flyby trajectories?

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