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Titan s plasma wake geometry from RPWS and MAG observations

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Up to now, several tens of Titan flybys have been successfully completed by Cassini and have revealed a highly dynamic structure of the near space environment of Titan. The upstream condition of the plasma flow is expected to affect Titan's induced magnetosphere.
The Titan's plasma wake has been investigated using observations from the Radio and Plasma Wave Science (RPWS) instruments (Gurnett et al, 2004) and the dual Magnetometer Technique MAG instruments (Dougherty et al, 2004). Electric field emissions were detected by the RPWS antennas during Cassini passes through Titan's wake. These narrow band emissions are identified as upper hybrid resonance emissions and therefore can provide a density estimate of the Titan's cold plasma. Some of Titan's wake flybys show a very strong asymmetry between the inbound and the outbound pass. Good examples are Ta and Tb flybys (Wahlund et al, 2005). Both flybys have a similar trajectory in Titan Interaction coordinate System (TIIS) and have the same illumination condition but the density profiles present major differences. Some of the Cassini flybys have been set back in the DRAP coordinate system (Neubauer et al, 2006) such that the upstream direction of the magnetic field is fixed, in order to determine the geometry of the plasma wake and study asymmetries. Maps of cold plasma in Titan's environment are presented. Information concerning the geometry of the wake is crucial to estimate accurately the plasma escape.

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