



## **RPWS Cold Plasma Results from the Inner Magnetosphere of Saturn - dust-plasma interaction near the E-ring?**

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We present new results indicating that the negatively charged E-ring ice-dust inside 6 RS couples electro-dynamically to the dense cold plasma in the inner magnetosphere of Saturn. The measurements by the Radio and Plasma Wave Science (RPWS) on board the Cassini spacecraft, in particular by the Langmuir probe, determine continuously the cold plasma characteristics of the inner magnetosphere. Typical values reveal a cold plasma component ( $T_e \sim 0.5-5$  eV,  $T_i < \text{few eV}$ ) near the ring plane with densities up to  $100 \text{ cm}^{-3}$  and dominated by water group ions. The moon Enceladus and the E-ring are probable sources for this plasma (after photo-ionization of the water rich gas). Langmuir probe voltage sweeps indicate that the cold plasma rotates around Saturn with a speed significantly less than co-rotation. We will also present interferometer estimates related to this issue. We believe the few Volts negatively charged ice grains trap the positive cold ions within their Debye-spheres, and therefore cause the cold plasma to slow down to Keplerian motion while at the same time affect the ice-dust motion through the co-rotational induced electric field.