



Structure of the Co-rotating high Density Plasma Region in the Outer Magnetosphere of the Saturn

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The Radio and Plasma Wave Science (RPWS) Langmuir probe (LP) onboard Cassini can observe electron densities in the tenuous plasma. In the outer magnetosphere near the equatorial plane of Saturn, the LP often observes regions where the densities are considerably higher than the surroundings. The densities vary from several 10^{-2} [cm^{-3}] up to 10 [cm^{-3}]. These regions are often associated with a few hundred [eV] electron structures observed by the Electron Spectrometer (ELS). These signatures often appear periodically close to the Saturn's rotational period. By plotting the data in the Saturn Kilometric radiation (SKR) longitudinal system, it is shown that the dense plasma region is located around $\sim 15^\circ$ SKR longitude with width of $\sim 75^\circ$. The inner boundary is at about $15 R_S$ and can appear as far out as $40 R_S$. Since the density value has a trend continued from the inner magnetosphere around $15 R_S$, we suspect the inner magnetosphere is the source of the plasma. We will present the size of the structure, location in the magnetosphere, and the thickness of this region by analysing the LP data from several orbits. We will also investigate the source region and generation mechanisms of the co-rotating dense plasma region.