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Location of the magnetodisk in the outer magnetosphere of Saturn based on ion densities

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Abstract

There are sequences of Cassini Titan encounters, in which the variation of the Saturn local time (SLT) of the flybys is small. Flybys of such a sequence measure the properties of the same region of the magnetosphere, and thus can be used to determine the general properties characteristic of that region. Within the time range DOY 092-285, 2009, around equinox, there were nine orbits, each of which included a Titan flyby around 22h local time. Between DOY 213, 2008 and DOY 86, 2009, the Titan flybys took place around 10h local time; between DOY 346, 2009 and DOY 276, 2010 all Titan flyby (except T67) was near 16-17h local time. In the first two cases the orbits were of high inclination, in the third one the orbits were near the equatorial plane. We investigate ion densities along these orbits derived from the measurements of the Cassini Plasma Spectrometer, to clarify how the ions are distributed around the magnetodisk of Saturn. These set of orbits allows us to compare the structure of the outer magnetodisk between nightside, dayside, and duskside; these results will be presented here.

In the nighside the approximate location of the central line of the magnetodisk is characterized by the reversal of the radial component of the magnetic field. We fitted the simple structural model of *Arridge et al.* [2011] as a reference for the location of the central line of the magnetodisk; it turned out that this model works well in the nightside magnetosphere.

The magnetodisk is a rotating, variable plasma structure. On the nightside it is narrow, thin and elongated (that is the magnetic field is dominated by its radial component) as previous research showed. As the disk rotates to the dayside, the magnetopause limits its extent, thus it becomes denser, hotter, and thicker. In this presentation we show to what extent this simple picture is valid.

References

Arridge, C. S., et al. (2011), Periodic motion of Saturn's nightside plasma sheet, J. Geophys. Res., 116, A11205, doi:10.1029/2011JA016827