



The formation of plasma structures in the magnetodisk of Saturn

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In situ measurements around Jupiter and Saturn revealed that both giant planets possess the complex magnetic/plasma structure, called magnetodisk. It is established that the magnetodisk is the result of the interaction of the planetary magnetic field with the relatively dense co-rotating plasma surrounding these planets. Recent observations of the Cassini space probe found that the plasma in the magnetodisk of Saturn shows a well-defined fine-structure, featuring narrow and dense layer(s) near the actual magnetic equator, which is rich in heavier water-group ions, and which is surrounded by a more tenuous plasma containing lighter ions mostly. The heavy-rich layer is found to have significantly lower temperature than the surrounding plasma. We present a new model, which is able to account for these (and several other) recently discovered properties of the Kronian magnetodisk. According to our model the formation of this kind of fine-structure is a general property of dense plasmashells in the environment of a co-rotating magnetodisk.