

MHD Simulation of Kronian Magnetosphere with Titan Plasma Torus

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The Saturn has a rapid rotation equivalent to Jupiter and has the comparable strength of the magnetic field with Earth. We have simulated the Kronian magnetosphere under the various solar wind conditions and found the interesting configurations of the magnetosphere. On the case of northward IMF we found the strong vortices due to the Kelvin Helmholtz instability and the dayside magnetic island. However our simulation model of the Kronian magnetosphere did not include the effect of Titan plasma torus. Titan locates at about 20 RS from the Saturn and neutrals from the Titan are ionized and picked up by the magnetic field of Saturn then the plasmas are fed into the magnetosphere. So the Titan plasma torus forms around 20RS from Saturn.

In this study we added the mass loading effect of Titan plasma torus to our simulation model. To investigate the effect of the torus to the vortices and magnetic islands, we compare the previous results of the simulation for northward IMF with the results of the simulation including the plasma torus. In addition, we compare our simulation results with the MHD simulation results of another group.