



Titan's plasma interaction during the Cassini T32 and T34 flybys: 3D multispecies hybrid simulations

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Titan's plasma interaction has been studied in terms of a three-dimensional, multi-species hybrid simulation model. The hybrid approach treats the electrons of the plasma as a fluid, while the ions are represented by macroparticles. Thus, finite ion gyroradius effects are fully covered by this model. On the one hand, Titan's plasma interaction during the T34 flyby is discussed. During this flyby, the Cassini spacecraft passed through the magnetic pile-up region at Titan's ramside while the moon was located at about 18:00 local time on its orbit around Saturn. The simulation results indicate the formation of a spatially dispersive exospheric tail structure, being highly asymmetric with respect to the direction of the corotational electric field. Besides, the simulation model is able to fully reproduce the key features of the magnetic field signature measured by the Cassini MAG instrument. On the other hand, we shall focus on Titan's plasma interaction during T32. During this flyby, Titan crossed Saturn's magnetopause in the subsolar region of its orbit and interacted with the plasma in Saturn's magnetosheath. By means of the simulation model, it is illustrated how Titan's plasma environment is affected by such sudden changes in the magnetic field direction and in the composition of the upstream plasma flow.