Hybrid Simulations for an Ion Scale Magnetosphere

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Interaction between the solar wind and the ion scale magnetosphere of dipolar magnetized objects is investigated by three-dimensional hybrid simulations, which treat the ions as kinetic super particles via particle-in-cell method and the electrons as a massless fluid. The hybrid simulations are suitable for the study of the ion scale magnetosphere which dayside stand-off distance is from several to tens ion Larmor radii of the solar wind protons at the dayside magnetopause boundary, because the ion kinetic effects play an important role in its solar wind interaction. We will discuss how the conditions of the interplanetary magnetic field change the structures of the ion scale magnetosphere with influences of the ion kinetic effects and the positions of the magnetic reconnection regions.