

MHD Simulation of the Jovian Magnetosphere by a Spatiotemporal Multi Scale Method

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In these decades, the Earth's magnetosphere has been studied energetically. It is well-known that the solar wind and interplanetary magnetic field (IMF) largely control the dynamics of the Earth's magnetosphere. However, we don't yet fully explicate what controls the dynamics of other planets.

Jupiter has the marked characters: the largest planet in the solar system, a short rotation period, the moon Io providing plentiful plasma sources. Therefore, the Jovian magnetosphere is different from the Earth's magnetosphere. In this study we have carried out the 3-D global magnetohydrodynamic (MHD) simulation to investigate the structure of Jovian magnetosphere. We use a Spatiotemporal Multi Scale Method that changes simulation time steps depending on the interval between grids.

Solar wind dynamic pressure greatly changes the configuration of the Jovian magnetosphere. It is thought that the IMF largely controls dynamics of the planetary magnetosphere. In order to understand the effects we have simulated the Jovian magnetosphere by using the 3-D global MHD model under the conditions that the solar wind dynamic pressure and the IMF change as parameters