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The Jovian magnetosphere, lessons learned from Galileo

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With the successful conclusion of Galileo's mission, we now have a comprehensive suite of field and plasma measurements in the magnetosphere of Jupiter. The observations have helped us characterize a rotationally driven magnetosphere over an extended period and a range of solar wind conditions.

The observations show that the Jovian magnetosphere shows strong temporal and local time variations. Though magnetic reconnection in the magnetotail appears to play a significant role in the dynamics of Jupiter's magnetosphere, it is not yet clear if the reconnection is mediated by the solar wind IMF properties or is driven by internal processes.

This talk will first summarize the observations from field, plasma and wave instruments in the magnetosphere of Jupiter. Next, I will explore the sources of local time and temporal variations in these observations and compare the observations with recent MHD simulations. Finally, by comparing the Jovian magnetospheric structure and processes with the Earth's magnetosphere, we will elucidate the unique properties of a rotationally driven magnetosphere.