



Characteristics and implications of Enceladus' distant wake observed by Cassini

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The moon of Saturn, Enceladus, has a water-vapor plume in its south pole which releases hundreds of kilograms of neutrals per second. Due to this strong mass-loading source, the magnetospheric plasma flow slows down near the plume center and the initially southward pointing field lines drape around it. On the downstream side, the slow flow and bent field lines persist in the wake of Enceladus until the plasma returns to the corotation speed. We look for the magnetic signatures of Enceladus wake, i.e. the bent field lines and magnetic fluctuations generated by the plume-magnetosphere interaction, by analyzing eight-years of Cassini magnetic field data both during Enceladus flybys and during the crossings of the orbit of the moon far downstream. We find that the wake signatures could extend as far as over 180 degrees downstream of Enceladus, with their strength getting weaker with distance. The L shells of these wake signatures show that the Enceladus wake occasionally moved towards Saturn but mostly moved outward away from Saturn, which indicates the plasma convection downstream of the moon usually has a small outward component.