

Several questions on the structure of the cometary induced magnetospheres

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Abstract

We will discuss several features of the cometary magnetosphere.

What is the 3D structure of the diamagnetic cavity? Does it possess closed surface as a boundary? In this case, there should be at least 2 neutral points at the boundary. What happens at the vicinity of these points? Or the tangential discontinuity is destroyed on the night side by some diffusive process and there is no closed boundary of the diamagnetic cavity.

The magnetic field in the tails of the induced magnetospheres (both comets and Venus) differs from that of the geomagnetic tail. In the latter, the magnetic field is directed predominantly along the tail axis. In the induced tail, the magnetic field component perpendicular to the axis is comparable with parallel component. There is certain contradiction with a simple draping picture and wind sock model of the comet.

What is the nature of the cometary rays? There are three possibilities: First, the rays are the magnetic flux tubes with increased plasma density. The rays parallel are parallel to the magnetic field in this case. Second, the rays are currents sheets associated with the nest draping. Third, the rays are plasma jets which are NOT parallel to the magnetic field.