Deflection of magnetodisk and the inner drift shells

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Link

Wednesday, 11 December 2019

- 13:40 - 18:00
    - Moscone South - Poster Hall

Abstract

Juno was inserted into a highly elliptic, polar, Jupiter orbit on July 4th 2016. Since then scientific observations of the Jovian magnetic field have been performed by the fluxgate magnetometer collocated in an optical bench together with the advanced stellar compass (ASC), which are placed in a boom at the tip of one of the solar panels. Juno orbits are highly elliptical and the ASC measures particles (mainly electrons) in the range >10MeV enabling scanning the radiation environment around the planet. Until now, Juno has completed 23 orbits, resulting in a detailed accurate model of the magnetic field. Similarly, the observations have resulted in a fairly detailed mapping of the trapped high energy flux at all distances. The magnetic surface field has thus been found to be surprisingly far from dipole-like, with strong local features. While this result in a dipole like field at distances larger than ~3 Rj, trapped particles are encountering a very complex field structure.

The superrelativistic electrons measured by the ASC ($\gamma >> 1$), travel at speeds very close to c, and bouncing between the North and South sphere, encounters complex field structures for at least some of the time. The bounce period is much smaller than the Jovian rotation period, and a large east-west drift component is caused by the magnetic field gradient. For these reasons, the drift shell description traditionally used for dipolar fields, are far from adequate to describe the behaviour of energetic particles travelling close to Jupiter.

We will present observations of the high energy particle fluxes of trapped particles close to Jupiter, show, and show how the magnetic field affects their motion shells. While the field allow (deformed) drift shells for orbits with L>1.3, we find, surprisingly, high fluxes are measured in regions where the magnetic field does not allow a closed drift shell.

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