High energy particle interactions with the Jovian satellites as observed from Juno

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Abstract

The MAG investigation's dedicated star tracker, the Advanced Stellar Compass (ASC), has continuously monitored high energy particles fluxes in Jupiter's magnetosphere subsequent to Juno's orbit insertion on July 4, 2016. The instrument performs this function by tracking the effects of radiation with sufficient energy to transit the instrument's radiation shielding. Such particles have energy >15MeV for electrons, >80MeV for protons, and >~GeV for heavier elements. With a sample cadence of 250ms, the ASC renders a detailed mapping of the trapped particles throughout space traversed by Juno. The Jovian satellites and rings have a profound effect on the measured fluxes. The observed signature from each satellite differs with the physical properties and environment of the moon, such as presence of a magnetic field, volcanism, etc. The line of apsides of Juno's orbit constantly evolves, as does the magnetic latitude at which Juno transits the satellite orbits, providing a good sampling of longitudinal phases between a given Moon and Juno over time. At just past the midpoint of the nominal mission, all major moons are profiled, including the shepherd moons Metis, Amalthea, Thebe, and, their associated rings. We present examples of these interactions and the implications these observations have for the physical properties of the moons, the density of Jupiter's dust rings, and the Io torus.

Plain Language Summary

The measured jovian satellite interaction with high energy particles and the specific characteristic depending on the moon in question, as observed by the Juno mission, is presented

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