

Boston University College of Arts & Sciences
Center for Space Physics

2017-2018 Space Physics Seminar Series

Io's Volcanic Atmosphere and Plasma Torus

The volcanically active moon Io supplies nearly 1 ton/s of escaping material that is rapidly ionized and shaped by Jupiter's magnetic field to form a toroidal plasma nebula. Emissions from this torus offer a unique opportunity to snap a picture of a magnetosphere through the lens of a telescope. This talk offers an introduction to the plasma torus and its interaction with Io from an observational perspective, via ground-based campaigns coordinated with JAXA's Hisaki and NASA's Juno spacecraft. Ion enhancements downstream of Io are newly observed. This visible Io phase effect differs from that in the UV and lags further behind the immediate wake. Such may reflect density and temperature perturbations as the plasma sweeps past Io, offering important clues about how this moon's atmospheric loss feeds the torus. Recurrent traits in the torus position are observed as a function Jovian longitude and local time. These yield a good match to earlier data sets, but a poor match to theory, which prescribes that it should track the magnetic field. The motion guides the plasma interaction with Io that in turn supplies neutral clouds and energetic atoms through charge exchange and dissociative recombination. The resultant fast neutral jet from Io has been observed to periodically impact the adjacent moon Europa under certain geometry, and has sufficient energy to escape the Jovian system entirely.

Thursday, April 19 at 4:00PM
725 Commonwealth Avenue
Room 502



Carl Schmidt
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