

The plasma dynamics of the Io plasma torus observed by the Hisaki

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The Io plasma torus situated in the Jovian inner magnetosphere is filled with heavy ions and electrons, a large part of which is derived from Io's volcanos. Being the key area connecting the radiation belt, where energetic electrons are created, with the mid-magnetosphere, where highly dynamic phenomena are taking place, revealing the plasma behavior of the torus has been among the key factors in elucidating Jovian magnetospheric dynamics. A global picture of the Io plasma torus can be obtained via spectral diagnosis of remotely-sensed ion emissions generated via electron impact excitation. Hisaki, an earth orbiting spacecraft equipped with an extreme ultraviolet spectroscope EXCEED, has observed the torus with a high spectral resolution and the data has been submitted to a spectral diagnosis analysis and a chemical balance modeling under the assumption of axial symmetry. Outputs from the investigation are radial profiles of various parameters including electron density and temperature as well as ion densities. This presentation shows the deduced timescales of inward and outward transportation of plasma. The ratio may represents the occurrence rate of depleted inward flux tubes seen in in-situ observation by Galileo. The possible future collaboration with Juno's microscopic observation on this topic will also be discussed.