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HISAKI 衛星搭載極端紫外分光撮像装置で観測されたイオプラズマトーラスの空間分布と時間変動
Structure and time variability of Io plasma torus observed by EXCEED onboard the HISAKI satellite

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Spatial distribution and time variability of emission lines of sulfur ions in Io plasma torus (IPT) measured by EUV spectrograph (EXCEED) onboard the HISAKI satellite are presented. The satellite has been launched on 14 Sep. 2013 and begun regular observation of IPT and Jupiter's UV aurora since middle of Dec. and it will continue until the end of Feb. A wide slit whose designed field of view (FOV) is 400 x 140 arcsec was chosen to measure both radial and latitudinal distributions of IPT. Jupiter's north aurora was guided at the center of FOV and its spectrum was simultaneously observed. Averaged spatial distribution of sulfur emission lines is consistent with previous observations. Looking at the time variability of IPT, new features were found from the EXCEED observation. The most surprising one is periodic variation synchronized with Io's orbital period. The variations in dawn and dusk sides were out-of-phase, suggesting the bright region is co-rotating with Io. The amplitude of the periodic variation is larger than those of well-known Jupiter's rotation periodicities in shorter wavelength and becomes smaller as increasing wavelength. The wavelength dependence suggests significant electron heating and/or hot electron production processes associated with Io. Another noticeable feature is long-term change in dawn-dusk asymmetry of the emission intensity which had not been reported so far. The asymmetry has been assumed to be a proxy of large scale dawn-to-dusk electric field generated in Jovian magnetotail and the origin of the variation observed will be discussed in detail. Sporadic change in the emission intensity of IPT associated with the aurora brightening event is expected to investigate in detail with the EXCEED observation to reveal energy transport process between inner and middle/outer magnetospheres. The expected event has not been detected so far and further continuous observation will be expected to resolve this issue.