Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

PPS001-16 Room:101 Time:May 27 12:30-12:45

Plan for Observing Jupiter's Magnetosphere using the EUV Spectrograph Onboard the Sprint-A/Exceed Mission

Fuminori Tsuchiya[1*], Ichiro Yoshikawa[2], Masato Kagitani[1], Kazuo Yoshioka[3], Naoki Terada[1], Yasumasa Kasaba[1], Go Murakami[2], Kouichi Sakai[2], Tatsuro Homma[2], Atsushi Yamazaki[4], Tomoki Kimura[4], Munetaka Ueno[4]

[1]Tohoku University, [2]The University of Tokyo, [3]Rikkyo University, [4]ISAS, JAXA

The EXCEED mission is an Earth-orbiting extreme ultraviolet (EUV) spectroscopic mission and the first in the SPRINT series being developed by ISAS/JAXA. EUV spectroscopy is suitable for observing tenuous gases and plasmas around planets in the solar system (e.g., Mercury, Venus, Mars, Jupiter, and Saturn). One of the primary observation targets is Jupiter, whose magnetospheric plasma dynamics is dominated by planetary rotation. In the EUV range, a number of emission lines originate from plasmas distributed in Jupiter's inner magnetosphere. The EXCEED spectrograph is designed to have a wavelength range of 55?145 nm with minimum spectral resolution of 0.4 nm, enabling the electron temperature and ion composition in the inner magnetosphere to be determined. The spectrograph slits have a field of view of 400 - 140 arc-seconds and an onboard target guide camera is used to stabilize attitude fluctuations to within 5 arc-seconds. With a large primary mirror (diameter: 20 cm) and high detection efficiencies (1?3%), EXCEED will measure Io plasma torus emission distributions with a good signal-to-noise ratio using an exposure time of 50 minutes and achieving spatial resolution of 20 arc-seconds. The previous observation of plasmas in the inner magnetosphere and the aurora with an EUV spectrograph was done by the Cassini spacecraft over a period of a few months. We re-examined the data obtained by the UVIS instrument to clarify the scientific objectives for the EXCEED mission. The UVIS observation sometimes showed sudden brightening in both the aurora and the Io plasma torus with a timescale from several hours to a few tens of hours. From the re-analysis of the UVIS data as well as radio waves (Cassini/RPWS) and the interplanetary magnetic field (Galileo/MAG) data, we found that the brightening events were related to a large-scale structure in the solar wind. However, because the Cassini observations had a lack of continuity due to the intermittent observation mode, it is difficult to make a definitive relation between the aurora and the plasma emissions in the inner magnetosphere. EXCEED plans to observe the variations in the aurora and in the radial structures of plasma emissions and should reveal the relationship between them in detail. The EXCEED observations are expected to investigate the radial plasma and energy transport processes in the rotation-driven magnetosphere.