Observation of the planetary atmosphere by EUV spectrometer onboard the TOPS spacecraft

Kazuo Yoshioka[1]; Takenori Toyota[2]; Go Murakami[2]; Fuminori Tsuchiya[3]; Masato Kagitani[4]; Hiroaki Misawa[4]; Ichiro Yoshikawa[5]

[1] Earth Planet Phys. Univ of Tokyo; [2] Earth and Planetary Sci., Univ. of Tokyo; [3] Planet. Plasma Atmos. Res. Cent., Tohoku Univ.; [4] PPARC, Tohoku Univ.; [5] Univ. of Tokyo

The Telescope Observatory for Planets on Small-satellite (TOPS) is now under development and it will be launched in 2012. On board the TOPS, the extreme ultraviolet (45 - 145 [nm]) spectrometer, whose spectral resolution equals 0.3 [nm], will be installed. One of the main purposes of this mission is to clear up the mechanisms of electron heating around the Io plasma torahs. For this purpose, we have to attain 1 hour-time resolution, 1 Jupiter radius spatial resolution and have to catch the area around 10 times of Jupiter radius in one frame. In order to determine the electron density and temperature around the plasma torahs, we will adopt line diagnosis by using the EUV resonance scattering lights from the various types of ions. The lights from the plasma torahs are very faint. So, we have to achieve the high efficiency (more than 0.015 [counts/sec/Rayleigh]) and very low dark count rate (less than 1[counts/sec/cm^2]). In this mission we will employ CsI-coated microchannel plate as a 2 dimensional photon counting devise which has high quantum detection efficiency to the EUV light (10 - 30 %). Furthermore, we will employ CVD-SiC for the primary mirror to enhance the reflectivity.

In our presentation, we show the development status of the detectors and the expected outcome from the line diagnosis around the Jupiter, Io plasma torahs.