

## Side view of the plasmasphere observed by Telescope for Extreme Ultraviolet onboard KAGUYA spacecraft

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The Earth's plasmasphere is the region where dense plasma originated from the ionosphere is captured along the closed geomagnetic field lines. Intensive observations using spacecrafts revealed the dynamical aspect of the plasmasphere changing depending on geomagnetic conditions. However, conventional in-situ measurements are local observations with which it is difficult to separate the temporal development and the spatial structure of the plasmasphere. To overcome this difficulty, the visualization of the plasmasphere has recently been emphasized. Helium ions are the second major component in the plasmasphere (almost 10% of the total amount), and resonantly scatter the solar EUV emission at 30.4 nm. For this reason, detecting this emission leads us to the global imaging of the plasmasphere.

Recent advances in satellite-based imaging techniques have made it possible to routinely obtain full global images of the plasmasphere. The Extreme Ultraviolet Imager (EUV) on the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) satellite gave us complete sequential pictures. The EUV instrument could obtain the equatorial distribution of the plasmasphere from near apogee of the polar orbit.

In 2007 we have succeeded in observations by the Telescope of Extreme Ultraviolet (TEX) aboard Japan's lunar orbiter KAGUYA. The TEX instrument detects the resonance scattering emissions of helium ions (He II: 30.4 nm) and oxygen ions (O II: 83.4 nm) to take images of the plasmasphere, the polar wind, and the inner magnetosphere. The maximum spatial and time resolutions are 0.07 Re and 1 min, respectively. The view afforded by the KAGUYA orbit encompasses the plasma distribution in a single exposure, enabling us to examine for the first time the globally-averaged properties of the plasmasphere from the meridian view. In this presentation, we report the initial results, especially of the meridional distribution of the plasmasphere, obtained by the TEX instrument between March and June 2008.