Helium Ion Distribution in the Plasmasphere Measured by the EUV Telescope onboard NOZOMI (Planet-B) Spacecraft

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We have succeeded in taking images of the plasmasphere with the EUV telescope (X-ray ultraviolet scanner : XUV).
We have determined the plasmaspheric He+ distribution from these remotely observed 2-dimensional images with the inversion technique. We made a model plasmasphere where He+ density is assumed to decrease with distance along the dipole magnetic field lines according to a specific function, and then we get the source densities at the ionosphere by a matrix inversion method. From the solutions we get through this process, we chose the function best fit to our observation by applying the AIC (Akaike Information Criterion) method.

We have succeeded in taking images of the plasmasphere with the EUV telescope (X-ray ultraviolet scanner : XUV) onboard NOZOMI (Planet-B) spacecraft both on 9 and 19 September, 1998 when the geomagnetic activity was moderate (Kp: 3). These pictures show that Helium ions in the duskside plasmasphere scatter solar EUV (He II) with the intensities of 1 Rayleigh while the Helium neutrals in the ionosphere scatter He I emission and the intensity is 10 Rayleigh. We found a clear boundary between low and high density regions at the plasmapause.

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