Evaluation of the Electron Spectrum Analyzer(ESA) onboard Kaguya (SELENE) satellite and first Analysis of its data

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Revolving around the Earth, the Moon lies in two different surroundings, magnetosphere or solar wind. And the Moon itself has structures ,that can influence particle motion, such as Lunar magnetic anomalies and Lunar wake. So it is very important to investigate behavior of particles around the Moon.

The Moon has no global magnetic field. However, measurements by magnetometers by Apollo subsatellites and sample returns showed the existence of extensive crustal magnetism. The largest areas of strong magnetic anomalies were located antipodal to impact basins such as Imbrium, Orientale, and Nectaris that were formed in the same period. And, according to Lunar Prospector data covering the whole lunar surface,strong magnetic anomalies were located radial, or antipodal to the Impact basins. These results show how the magnetic anomalies were made. And these anomalies also correlate with albedo markings on lunar surface. This is because structure like mini-magnetosphere around the anomalies and related shock will deflect Solar wind ions.
Lunar Prospector observed electron heating near the anomalies.

An electrostatic analyzer ESA(Electron Spectrum Analyzer) is onboard Kaguya, which is also expected to observe magnetic anomaly by electron reflection method. Since Kaguya is a three-axis attitude controlled satellite, we need two sensors mounted on the moonward and the anti-moonward spacecraft panels in order to obtain three-dimensional electron distribution function. The ESA sensor basically employs a method of a top-hat type electrostatic analyzer placing angular scanning deflectors at the entrance and toroidal deflectors inside. The Field Of View(FOV) is electrically scanned between +/-45 degrees inclines from the axis of symmetry.

This time, to observe electrons and anomalies exactly, we evaluated the sensitivity of ESA, using real data. We will give a presentation about this evaluation and the first analysis of its data.