Calibration of ion species determination on LEPi onboard the Arase satellite

*Tatsuya Hasegawa[1], Kazushi Asamura[2], Yoshizumi Miyoshi[3], Yoshifumi Saito[2]

1. Department of Earth and Planetary Science,Graduate School of Science,The University of Tokyo, 2. ISAS/JAXA, 3. Institute for Space-Earth Environmental Research, Nagoya University

LEPi (Low-Energy Particle experiments - Ion mass analyzer) is one of the particle instruments onboard the Arase satellite. LEPi is an ion energy-mass spectrometer which covers an energy range from 0.01 keV/q to 25 keV/q. In order to resolve the species of incoming ions, LEPi uses a combination of an electrostatic energy-per-charge analysis and a TOF (Time-Of-Flight) technique.
In TOF analysis, the velocity of the incoming ion is identified by measuring the elapsed time between two signals (START and STOP signals). For the START signal, secondary electrons released at the passage of incoming particles through the ultar-thin carbon foil are used. The incoming particle itself is used for the STOP signal. Because of the usage of the foil, the measured TOF time contains several uncertainty factors, such as energy loss and angular struggling of the incoming ions at the passage of the foil. flight time of the secondary electrons, etc. Therefore the measured TOF profiles overlapped between different species.
In order to distinguish the species, we have estimated an analytical function which reproduces the TOF profile for each species by a fitting analysis. This will be used for calculating the physical quantities from the observed count data.

Keywords: Arase, low-energy ion, TOF, observation

