

Development of a Thermal and Supra-thermal ion Analyzer for an experiment of Sounding Rocket

*Yushi Suto¹, Kazushi Asamura², Yoshifumi Saito^{1,2}

1. Graduate School of Science., University of Tokyo., 2. Solar System Science Division, Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency

In the terrestrial magnetosphere, plasma particles with a wide energy range from $< 1\text{eV}$ to MeV exist simultaneously. These particles are generated and/or transported via interactions with plasma waves. For example, in-situ particle observations have revealed that the inner magnetosphere contains significant fraction of low-energy plasma particles originated from the ionosphere. Their typical energy is a few tens of eV in contrast to much lower energies in the ionosphere. However, acceleration and transport processes of these particles are still unknown. This is mainly due to lack of observations of thermal and supra-thermal ions. In general, a measurement of plasma particles with energies less than a few tens of eV is easily affected by spacecraft potential. One of the solutions to suppress this effect is to mount the instrument on top of an extendable boom. The effects of the spacecraft potential are suppressed by controlling the chassis potential of the instrument.

We are developing a thermal and supra-thermal ion mass spectrometer which is light enough to be mountable on top of the boom. This instrument consists of a top-hat type electrostatic energy analyzer and a time-of-flight type mass analyzer. In the current design, diameter of the instrument is less than 10 cm. We will show the instrument design and its development status.

Keywords: Thermal and Supra-thermal ion, Ion analyzer, Sounding rocket