

ERG 衛星搭載 MEP-e と MEP-i の設計および検証計画 Design and verification plan of MEP-e and MEP-i onboard ERG

笠原 慧^{1*}, 浅村 和史¹, 三谷 烈史¹, 高島 健¹, 平原 聖文², 山崎 潤³

Satoshi Kasahara^{1*}, Kazushi Asamura¹, Takefumi Mitani¹, Takeshi Takashima¹, Masafumi Hirahara², Jun Yamasaki³

¹ISAS/JAXA, ²名古屋大学, ³東京大学

¹ISAS/JAXA, ²Nagoya university, ³The university of Tokyo

We have been developing instruments for the observations of the medium-energy electrons (10-80 keV) and ions (10-180 keV/q) in our coming radiation belt mission ERG (Exploration of energization and Radiation in Geospace). The mission goal is to understand the radiation belt dynamics during space storms. The medium-energy electron measurement is one of the most important issues in this mission since these electrons generate whistler chorus waves, which are believed to play significant roles in the relativistic electron acceleration and loss during storms. On the other hand, such a measurement has been a challenging issue due to the harsh radiation environment, where penetrating particles and secondary particles result in significant background. Our strategy for enhancing signal-to-noise ratio is to combine an electrostatic analyzer and silicon detectors, which provide energy coincidence for true signals. In parallel with the electron instrument, we also have designed and tested a medium-energy ion mass spectrometer. This instrument is comprised of an electrostatic analyser, time-of-flight (TOF) mass spectrometer, and solid state detectors, hence it can measure energy, mass and charge state of medium-energy ions. It provides significant information of particle flux and pitch angle distribution of ring current core components, which contributes to the radiation belt dynamics via electromagnetic waves and global magnetic field deformation.