

[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM16] Dynamics of Earth's Inner Magnetosphere and Initial Results from Arase

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Earth's inner magnetosphere is a fascinating source of space research problems. There remain many fundamental questions concerning the physics of the radiation belts, the ring current, the plasmasphere and the ionosphere. The JAXA spacecraft Arase (ERG) was successfully launched in December 2016, and has since been providing excellent data on waves, particles and fields over a range of L-shells in the inner magnetosphere. This session particularly welcome submissions related to the Arase mission. As well, data from other recent missions to the magnetosphere are also welcome, including the Van Allen Probes, MMS, and THEMIS. Topics of interest include charged particle interactions with the predominant electromagnetic wave modes such as whistler-mode chorus and hiss, ion cyclotron waves, magnetosonic waves, and ULF waves. Projects involving the prevailing issues of particle acceleration and loss, and particle transport are also of interest. In addition, projects involving the coupling of plasma populations in the inner magnetosphere are also timely. Studies involving observations, simulations, theory and modeling are all invited.

[PEM16-P25] Calibration and observation mode of High Frequency Analyzer onboard ARASE

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The high-frequency analyzer (HFA) is one of sub-systems of the plasma wave experiment (PWE) onboard the Arase spacecraft. The primary objects of the HFA are determining the local electron number density at the spacecraft from observations of upper hybrid resonance (UHR) waves and observing radio and plasma waves from 20 kHz up to 10 MHz excited in the storm-time magnetosphere. Two AC electric field components perpendicular to the spacecraft spin axis received by wire-probe antenna (WPT-S), E_u and E_v , and one component of AC magnetic field parallel to the spin axis measured by magnetic search coils, B_z , are input to the HFA and two of three inputs are selected by input selector. In this paper, calibration procedures of the HFA is presented in detail. The frequency characteristics of the wire-probe antenna (an effective length of dipole antennas and pick-up factor at the preamplifier input) was evaluated using electromagnetic computation with the moment method. The gain calibration of PWE preamplifiers and the HFA is done based on both results of preflight test and onboard flight calibration. Results of the HFA calibration were compared with electric and magnetic field intensities measured by onboard frequency analyzer (OFA) in the frequency range overlapped with HFA (10-20 kHz) and confirmed good agreement with each other. The HFA regularly has three observation modes: EE mode (two electric field), EB mode (one of electric field components and B_g), and plasma-pause (PP) mode. In the EE mode, full

spectra from 2kHz to 10MHz are observed around apogee (electron cyclotron frequency $f_c < 10\text{kHz}$). In the EB mode, the full spectrum of electronic field component and cross spectrum between electronic and magnetic field are observed around perigee ($f_c > 10\text{kHz}$). Nominal time resolution of the EE and EB mode spectrum is 8-second. The PP mode is operated around predicted plasma pause crossings. In this mode, sum of two electric field component in the limited frequency range of 2-400kHz is observed with 1-second time resolution. In addition to the limited frequency spectra, the full frequency spectrum with 1-minute time resolution is also observed during the PP mode. Since Nov. 17 2017, left and right-hand polarized electric field components have been observed in the EE mode.