「我々の将来ミッション」における電場・波動・電波計測：特にＥＲＧ計画

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Electromagnetic field measurements for our future missions: Especially for ERG

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The electric field from DC to several 10s MHz is important for the clarification of global plasma dynamics, energetic processes, and wave-particle interactions in the planetary Magnetospheres by in-situ and remote sensing studies. We have developed the instruments for several missions, i.e., (1) BepiColombo Mercury Magnetospheric Orbiter (MMO) to Mercury [just in FM development], (2) the small-sized radiation belt mission, ERG (Energization and Radiation in Geospace) [in design], (3) the cross-scale formation flight mission, SCOPE [in conceptual design], and (4) the future Jovian mission, EJSM, including JAXA Jupiter Magnetospheric Orbiter (JMO) and other elementss [in conceptual design]. Those will prevail the universal plasma mechanism and processes in the space laboratory.

The common purposes of electric field, plasma waves, and radio waves observation in those missions are: (a) Examination of the theories of high-energy particle acceleration by plasma waves, (b) identification of the origin of electric

fields in the magnetosphere associated with cross-scale coupling processes, (c) diagnosis of plasma density, temperature and composition, and (d) investigation of wave-particle interaction and mode conversion processes.

In order to achieve those objectives, the instrument including rigid antenna, wire antenna, search coil sensors, and integrated receiver systems are now in development. Some of them were already used on the sounding rocket experiments (S310-23 launched by ISAS/JAXA) in 2007, and will also be used soon. As the applications of those development, we also try to adopt them to the space interferometer and the radar sounder.

In this paper, we will summarize the current plan and efforts for those future activities. Especially, the Plasma Wave Experiment (PWE) aboard the ERG mission, just in the design phase, will be introduced.