Development of DC electric field and plasma wave investigations for future missions

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In order to realize the lightweight and highly precise DC/AC electric-field measurement in the magnetosphere/ionosphere for future missions, the fusion of the present receiver system a DC/AC division type which was established by GEOTAIL (It has been inherited by BepiColombo/MMO) and the DC/AC integration type currently used in Cluster is needed. For this objective, the floating circuit technology in an electric system, i.e., a) low noise floating power supply, b) DC/AC common broadband floating amplifier, and c) floating potential control section by the preamp output are required.

By the circuit designs & testing of the BBM level, the electric component technology for DC - 10 MHz band observation for future terrestrial magnetospheric mission was established. This model is used in last summer by S-520-23 sounding rocket experiment as the common preamp of electric field and a LF/MF radio receiver and HF band measuring instrument. It is the first proof test in the space science.

The next steps of the development are for 1) Extension of the control range of floating ground to +/-100 V - +/-200 V and 2) Floating circuit of a bias current circuit. And the development of the common technical base of lightweight and sensitive observation for the low frequency interferometer and future Jupiter mission is also included: 3) Extension of the maximum frequency to 30 - 50 MHz, and 4) The one-order improvement of the sensitivity in 10 kHz or more.

In this presentation we will show about an investigation of floating amplifier and results of test for a bread board model (BBM) of the floating amplifier. And new type pre-amplifier can be applied to the investigations in the magnetosphere and ionosphere for future missions