

Plasma Wave Investigation for Mercury Magnetospheric Orbiter

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The BepiColombo mission is the international cooperation project for the Mercury investigation. Two orbiters and one lander will be planned to be launched in 2010. In this mission, we are proposing the electron temperature measurement system in the Solar Wind near Mercury by using the data observed by Plasma Wave Investigation (PWI) onboard Mercury Magnetospheric Orbiter (MMO). The electron measurement using plasma wave data have the advantage to the particle measurements in the point of time resolution. In order to measure electron temperatures, we need to observe thermal noise spectra of electrons, and compare it with theoretical ones in the frequency range around electron plasma frequencies. Since in the previous Japanese missions, we did not target the measurement of the electron thermal noise, the noise level of preamplifiers is much larger than the electron thermal noise level. We could not investigate its spectrum. We have developed the low noise preamplifiers for PWI. It also covers the wide frequency range of the AC electric field investigation of PWI from a few Hz to 3MHz. Further, we calculate the antenna pickup factor in the Mercury magnetosphere and solar wind regions and using the results, we compare the expected electron thermal noise level at the input of the preamplifiers with the noise level of the newly developed preamplifiers.