

## The development of the wave particle correlator designed on FPGA demonstration board

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Wave-particle correlator(WPC), which is a technique of applications of the waveform measurements, have not been used in the missions. This instrument can directly observe wave-particle interactions by calculating cross correlation functions between obtained waveforms and detected particles on board. We performed computer simulations in order to examine the function and data quality of the WPC and found that the correlation between the waveform and particle velocity distribution in the linear stage and non-linear stage of the wave-particle interaction is different from each other. WPC was conventionally realized by hardware. Additionally, the poor count rate of the particle detector causes the low time resolution.

In this paper, we are developing the WPC for the next mission what explored the magnetosphere tail region. As the next exploring mission was planned to observe the waveform and particle with much higher resolution than that of Geotail spacecraft, we need to develop the much high-spec system. Also as the satellite will be much smaller because of the multi-satellite mission, we must develop the small and lightweight measurement investigation. We are now installing the designed wave particle correlator in FPGA chip on the demonstration board and test the program. We will also test the analog wave signals as the electric field from sample A/D board connected to the demonstration board. The sampling rate of the signals is 600kHz. We will introduce the result of the test WPC program and verify it.