

Development of very low noise analog VLSI for the HEP instrument onboard MMO spacecraft

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The continuation nature of an energy spectrum is indispensable, to clarify the particle acceleration phenomenon in Mercury environment. However, always in around 30keV, the energy gap of LEP and HEP have become a problem. It is a key that the HEP instrument that used Si detector with high energy resolution is to be able to measure particles with lower energy than 30keV.

Developing the Si detection device of the thin dead layer type that eliminated an Al electrode, newly it is able to measure particles with lower energy than 30keV at present. On the other hand, the satellite temperature environment in the Mercury vicinity is predicted that it becomes 50 or more severe degrees for a Si detector. As for the Si detector a leakage current has increased by temperature. It was difficult to the noise level has increased in the reading circuit of established due to, this leakage current and achieve 30keV. Low noise analogue VLSI(VA32TA) that did development, newly this time sets up to 50 degrees action optimal temperature, besides it has the cancellation circuit of an active leakage current to the input step and be designed as it acts with low noise to 70 degrees.

A report about each point on the Mercury each orbit where is hypothesized the possibility of the measurement lowest energy 30keV achievement, that is a final goal by the combination with the Si detector, beside we report about the action evaluation under the high temperature environment of VA32TA that was developed in this announcement, and also it discusses.