

Development of a Low Energy Particle Electron Spectrum Analyzer (LEP-ESA) onboard the ICI-2 Sounding Rocket

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Strong HF radar backscatter echoes are well-known characteristics of the polar cusp region by the ground-based observation of HF radar in the polar ionosphere. The gradient drift instability is regarded as a dominant mode for producing backscatter targets. According to Moen et al. [2002], decameter scale measurement that cannot be achieved by ground-based and satellite observations is required in order to understand the generation mechanism of backscatter targets. Norwegian sounding rocket experiment ICI-2 (Investigation of Cusp Irregularities) is proposed in order to single out the mechanism(s) running cusp ionospheric plasma unstable and facilitate backscatter targets for HF radars. ICI-2 will be launched into the cusp ionosphere from Svalbard, Norway in Dec. 2008. We are responsible for developing a low energy particle electron spectrum analyzer (LEP-ESA) that is one of the science payloads onboard the ICI-2 sounding rocket. To achieve fine scale measurement, very high time resolution is necessary. High time resolution requires high sensitivity (g-factor) of the analyzer sensor and high signal-processing capability of the detector. In the present study, characteristics of the analyzer that have been studied with experiments as well as numerical simulations are shown. We will also show the performance of an MCP multi-anode with an Application Specific Integrated Circuit (ASIC) that we have been developing.