

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. 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 cusp ionosphere from Svalbard, Norway in Jan 2009. 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 a sensor and high signal-processing capability of a detector. In present study, characteristics of the sensor that have been studied with experiments as well as numerical simulations and the multi-anode with the Application Specific Integrated Circuit (ASIC) techniques that we have been developing are shown.