Construction of electron beam line and Examination of APD and Electrostatic Analyzer for measurement of Medium-energy electrons

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It is known that intense fluxes of energetic particle are changed in the inner magnetosphere of the Earth during magnetic storm. But their dynamics has not been well understood, therefore it is necessary to observe plasma with wide energy range. Recently the Satellite which is loaded several instruments is planed. So there is possibility of experimenting on performance of the instruments at a simultaneous period. Because of this , in addition to an electron-ion beam line at present in a clean room of Rikkyou University, we constructed another beam line. And we plan to use APD to Medium-energy particle analysis. In this presentation, we show principle of the beam line and result of examining APD and Electrostatic Analyzer which have been produced by JAXA.

At first we studied property of APD in a vacuum chamber by entering electrons of various energy. Next we changed bias voltage and examined pulse height obtained from APD. By increasing voltage, high pulse heights were obtained. Here is the problem that the leakage current flows by increasing voltage and noise level grows. It is necessary to adjust bias voltage to detect low-energy electron. And we changed the angle of incidence of electron to plus minus 30 degrees and examined pulse heights.

To study measurement performance of Electrostatic Analyzer, electron beam is impinged on the Analyzer. After energy analysis by Eractrostatic Analyzer we plan to detect electron by APD. We show the result of examining how electron count rate from APD depend on electron energy and the angle of incident.