

Current status on the development of the Suprathermal Plasma Analyzer (SPA)

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When we try to investigate the energy budget in the ionosphere, it is important to consider the process of energy transfer from photoelectron to thermal electron. However there is no observation in the energy transition region (2-5 eV) in the lower E-region. Two main difficulties exist for measurement; 1) In the energy transition region electron number density is too small to be measured by a Langmuir probe method which is ordinarily used and 2) atmospheric pressure is so high in the height region from 90 km to 110 km that the sensor which requires high voltage cannot be employed.

For these reasons above we are now developing instrument to measure the electron energy distribution function in the lower ionosphere. The principle of instrument is based on Retarding Potential Analyzer with a small sampling orifice and the energy distribution is obtained by use of the Druyvesteyn method. The channel electron multiplier (CEM) is used as an amplifier and the differential pumping system enables CEM to work in the low vacuum condition.

In this presentation, we report on the present status of development of the instrument.