Instrumentation for space science

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This session will cover instrumentation and measurement techniques for the study of space science. We welcome contributions discussing newly designed instruments, and mission oriented instruments for satellites / sounding rockets already in space or near launch as well as the ground based instruments. Status reports on the space missions are also welcome. This is the international session. We encourage the contributions especially from the Asian countries based on their own space missions.

10:30 AM - 10:45 AM

Plasma properties of the space plasma operation chamber at NCKU in Taiwan

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The space plasma operation chamber (SPOC), a research facility designed to calibrate and test satellite/rocket-borne instruments and study space plasma processes, is constructed at NCKU in 2009. It is a cylindrical chamber of 2m in diameter and 3m in length. Plasma is produced by two back-diffusion type sources installed at the center of both chamber sides. The sources produce ions of controllable drifting energy from a few ten to several hundred eV and density up to $10^6$ cm$^{-3}$. These ions are neutralized by thermal electrons emitted from Nickel cathodes, and collide with neutral molecules in the chamber of pressure $\sim 2.2 \times 10^{-4}$ Torr, and a plasma environment with ion temperature $\sim 300$K and electron temperature $\sim 1000$-3000K is formed in the chamber. This paper presents measurement results of a retarding potential analyzer (RPA), an electron temperature and density probe (TeNeP) and a Langmuir probe installed on the 2-axis moving system in SPOC. The thermal and beam component ion energy distributions at different distances from the ion source and the electron temperature/density spatial distributions in the SPOC will be presented. The collision process of ions with neutral molecules will also be discussed.