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STATUS AND GROUND CALIBRATION RESULTS OF THE PLANETARY ION CAMERA (PICAM) FOR BEPICOLOMBO AND THE JOVIAN ELECTRON AND ION SPECTROMETER (JEI) FOR THE JUPITER ICY MOONS (JUICE) MISSION.

Abstract

The Max Planck Institute for Solar System Research (MPS) is contributing among others things to the plasma packages of the up-coming missions BepiColombo and JUICE.

JUICE will carry the Particle Environment Package (PEP) with the MPS contribution JEI. Upon its arrival at Jupiter in 2030, the instrument is designed to characterize the Jovian magnetosphere and the plasma interaction with the Galilean moons.
JEI is an electrostatic analyzer and covers an energy range of 1eV to 40keV for electrons and ions respectively at 10% resolution. It has a field of view of almost one hemisphere at 22.5° resolution. The measurements will allow determining temporally and spatially resolved distributions of charged particles.

BepiColombo, which is targeting to launch in October 2018 will carry the Search for Exospheric Refilling and Emitted Natural Abundance (SERENA) experiment. MPS contributed hereby hardware to PICAM. The sensor is an ion imager with 2π field of view. It has an energy range of 1eV to 3keV at an energy resolution of up to 10% and a time-of-flight analyzer with a $m/\Delta m$ ratio of about 100. The instrument will contribute to the analysis of the magnetic field configuration of Mercury and its interaction with the solar wind.

For the ongoing calibration of the instruments, the existing ion and electron source at MPS has been upgraded. An increased beam quality and automatized measurement procedure allows a detailed characterization for both polar angles, accelerator voltages and instrument operation modes. In course of the measurement, cross talk, angular and energy resolution as well as the ion grid optics have been mapped.