

Analyzer of Space Plasmas and Energetic Neutral Atoms (ASPERA-4) Onboard Venus Express

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A replica of the instrument ASPERA-3 for the Mars Express mission will be launched onboard Venus Express to Venus in 2005. The general scientific objective of the ASPERA-4 experiment is to study the solar wind - atmosphere interaction and characterize the plasma and neutral gas environment in the near-Venus space through energetic neutral atom (ENA) imaging and in-situ ion and electron measurements. The ASPERA-4 instrument comprises four sensors, two ENA sensors and an electron and ion spectrometer. The Neutral Particle Imager (NPI) provides measurements of the integral ENA flux in the energy range 0.1 - 60 keV with no mass and energy resolution but comparatively high angular resolution 4.6deg x 11.5deg. The Neutral Particle Detector (NPD) provides measurements of the ENA flux in the energy range 0.1 - 10 keV, resolving velocity and mass (H and O) with a coarse angular resolution. The Electron Spectrometer (ELS) is a standard top-hat electrostatic analyzer in a very compact design with the high 8% energy resolution to perform photoelectron spectroscopy. These three sensors are located on a scanning platform to cover ideally the full sphere. Ion Mass Analyzer (IMA) provides ion measurements in the energy range 0.01 - 30 keV/q for the main ion components (1, 2, 4, 16 amu/q) and the group of molecular ions (20 - 80 amu/q). The instantaneous field of view is 4.6deg x 360deg. Electrostatic sweeping performs the elevation (90deg.) coverage. ASPERA - 3 and ASPERA - 4 provide a unique opportunity to investigate the solar wind interaction with two non - magnetized planets by the identical instrumentation. We review the experiment and present the flight model calibration results.

Keywords: Planetary magnetospheres; solar wind interaction; Venus; instruments