

On the instrumentation and function of the Energetic Particle Detector (EPD)

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Abstract

Energetic Particle Detector (EPD) experiment is one of the payloads of the in-situ instruments on the Solar Orbiter spacecraft. It will measure the composition, timing and distribution functions of suprathermal and energetic particles. The overall coverage achieved with the EPD sensors is 0.002 MeV/n to 20 MeV/n for electrons, 0.003 MeV to 100 MeV for protons and 0.008 MeV/n to 200 MeV/n for heavy ions. It will facilitate to understand the acceleration mechanisms, transport processes of solar energetic particles as well as magnetic connectivity through the use of suprathermal particles as field-line tracers; the radial dependence of CME-driven shocks etc. The EPD instrument consists of four separate sensors sharing a common data processing unit (CDPU) with low voltage power supply (LVPS). Each sensor has specific measurement tasks to cover the required range of particles and energies. Multiple sensor heads are placed at different locations with multiple view of directions relative to the magnetic field direction. This will extend opportunity to measure pitch angle distributions of particles. In our presentation, we will give a briefing over the instrumentations and functions of the four sensors of the EPD.