Contribution ID: **17** Type: **Oral**

# The High-Energy Particle Detector (HEPD-01) in orbit since 2018: achieved results and ongoing studies

*Wednesday, 19 June 2024 09:25 (25 minutes)*

Since February 2018, the High-Energy Particle Detector (HEPD-01) has been studying the wide plethora of galactic, solar and trapped particles along the Sun-synchronous and low-Earth orbit of the China Seismo-Electromagnetic Satellite (CSES-01). Entirely designed and built in Italy, this light and compact payload is equipped with a silicon tracking system, a segmented plastic scintillator plane as trigger, a range calorimeter - comprising a tower of plastic scintillator planes and a matrix of LYSO crystals - and a plastic scintillator anti-coincidence system. The combination of these sub-detectors optimizes the measurement of electrons, protons and light nuclei in the 3-100 MeV, 30-300 MeV and 30-300 MeV/n energy ranges, respectively. During these years in orbit, HEPD-01 proved well suited for the study of both short time-scale, impulsive and transient space weather phenomena, among which the G3-class geomagnetic storm of August 2018 and the solar energetic particle event of October 2021, and long time-scale effects, such as the solar modulation of galactic cosmic-ray protons. In addition, HEPD-01 provided new results on some particle populations inside the Earth's magnetosphere: the stably trapped protons in the South Atlantic Anomaly, the downward-going, albedo protons, and the re-entrant leptons above the few MeVs energy threshold.
In this work, I will present the main scientific results already obtained by HEPD-01 concerning the above-mentioned topics, the ongoing analyses and, very briefly, the future studies with the second High-Energy Particle Detector (HEPD-02), which will be launched on board the CSES-02 satellite in late 2024.

**Primary author:** PALMA, Francesco (Istituto Nazionale di Fisica Nucleare)

**Presenter:** PALMA, Francesco (Istituto Nazionale di Fisica Nucleare)

**Session Classification:** Galactic and Solar Cosmic Rays

**Track Classification:** Galactic and Solar Cosmic Rays