



Contribution ID: 172

Type: Poster

MC simulation of HEPD detector - performances and beam test analysis

Wednesday, September 5, 2018 6:43 PM (1 minute)

The High-Energy Particle Detector (HEPD) is an instrument devoted to the measurement of electron, proton and light nuclei from few MeV up to hundreds MeV. HEPD has been developed by the Italian Limadou collaboration in the framework of the Chinese CSES (China Seismo-Electromagnetic Satellite) space mission. The HEPD will give a strong contribution to the CSES mission by measuring the precipitation of trapped particles and by studying the solar-terrestrial environment through mechanisms like coronal mass ejections and solar energetic particle emissions.

CSES satellite was successfully launched on the 2nd of February 2018 and injected into a circular Sun-synchronous orbit with 98° inclination and 500 km altitude. Expected lifetime is 5 years.

Two models of the detector have been entirely integrated in the clean rooms of WiZard laboratory at University of Rome Tor Vergata: a Qualification Model (QM) for calibration tests and a Flight Model (FM) for the space mission. Beam tests have been carried out before the launch with electrons, protons and nuclei up to Oxygen for both QM and FM.

In this poster the main features of the HEPD Monte Carlo simulation and some results of the detector performances based on MC simulations are reported. Particular importance will be given to MC nuclei data analysis.

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Session Classification: Posters session