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DEVELOPMENT OF A PENETRATING PARTICLE ANALYZER FOR HIGH-ENERGY RADIATION MEASUREMENTS IN DEEP SPACE AND INTERPLANETARY MISSIONS

Abstract

The Penetrating particle ANalyzer is an instrument designed to operate in space to precisely measure and monitor the flux, composition, and direction of highly penetrating particles of energy ranging from 100MeV/n to 20 GeV/n filling the current observational gap in this energy interval. The detector design is based on a modular magnetic spectrometer of small size and reduced power consumption and weight to make the instrument suitable for deep space and interplanetary missions. The high-field permanent magnet sectors are instrumented with high resolution silicon micro-strip detectors, Time-OF-Flight scintillator counters readout by SiPMs, and active Pixel detectors to maintain the detection capabilities in high rate conditions occurring during solar energetic particle events (SEPs) or when traversing radiation belts around planets. We will present the PAN concept together with the ongoing activity on the development of a demonstrator, Mini.PAN, for the in-orbit validation of the key functionalities of the instrument.