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High Energy Particle Spectrometer for ESA Lagrange mission

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The LGR High Energy Particle Spectrometer HEPS for the ESA Lagrange mission belongs to the satellite in-situ instrument suite. The satellite will be placed at the Lagrange point L5 for space weather measurements and real-time observations and alerts. The HEPS instrument with its six detector subsystems will enable the detecting of electrons, protons, and heavy ions at high flux conditions during Solar Energetic Particle Events. The electron and proton detection systems rely on standard telescope techniques covering energy ranges from 100 keV to 15 MeV and 3 MeV to 1 GeV respectively. Two sets of telescopes will be installed facing opposite directions along the Parker spiral. Additional detector with a wide angular range will enable measurements of angular distributions of particles traveling towards the satellite from the Sun. The HEPS heavy-ion telescope HIT represents a new design utilizing a set of scintillators and SiPM light converters. HIT electronics is equipped with a dedicated radiation-tolerant ASIC optimized for low power use and fast signal detections. The first model of HIT was developed and verified for spectroscopic measurements and ion identification. We report on test measurements as well as Monte Carlo simulations of the whole instrument. Results will be discussed and implications on the final design of the instrument provided.