



The Miniaturized Electron pRoton Telescope onboard CeREs and CUSP CubeSats

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The MERiT, Miniaturized Electron pRoton Telescope, is an innovative instrument that combines avalanche photodiodes (APDs) and stack of 8 solid-state detectors (SSD) to measure electrons, protons and ions in a compact low mass, and power form factor. MERiT data comprise differential channels, PHA, and singles whose cadences are changeable via ground commands. MERiT is the science payload on CeREs, the Com-compact Radiation belt Explorer, a 3U CubeSat, and CUSP, The CubeSat mission to study Solar Particles.

CeREs whose primary science goal is to study electron microbursts in the radiation belts was launched December 2018 into a high inclination low earth orbit. CeREs measurements will address the physics of the acceleration and loss of radiation belt electrons and enable measuring solar electrons and protons (SEP) over the polar open-field line regions. CeREs will complement and extend the science goals of the Van Allen Probes, by measuring electron precipitation caused by plasma waves characterized by Van Allen Probes.

CuSP is an interplanetary CubeSat addressing two science objectives: 1) study the sources and acceleration mechanisms of solar and interplanetary particles in near-Earth orbit and 2) support space weather research by determining proton radiation levels during Solar Energetic Particle (SEP) events and identifying Suprathermal (ST) properties that could help predict geomagnetic storms.

We describe the MERiT instrument and its capabilities on CeREs and CUSP and discuss its applicability to a proposed mission using a constellation of CubeSats.