

EUSO-SPB2 Cherenkov Camera Built on SiPM With GET-based Readout

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We plan to design, build and deploy a second generation of the Extreme Universe Space Observatory (EUSO), to be flown aboard a Super-Pressure Balloon (SBP). EUSO-SPB2 will view the night sky in the Southern hemisphere to detect cosmic rays of very high energies and pioneer the search for cosmogenic and astrophysical neutrinos from a sub-orbital platform. EUSO-SPB2 is a pathfinder for the Probe Of Extreme Multi-Messenger Astrophysics (POEMMA) mission which was selected by NASA for an Astrophysics Probe Mission Concept Study (under ROSES-2016). EUSO-SPB2 will observe a sample of cosmic rays from 0.1 to 1 EeV with the Cherenkov technique and will discriminate among the Cherenkov profiles of primary protons, heavy nuclei, and photons. It will also characterize the background for upward going showers initiated by the decay of tau leptons, which are expected to be produced by Earth-skimming tau neutrinos. The focal plane of the Cherenkov camera will utilize Silicon Photomultipliers (SiPM). Two concepts for the data acquisition system are under consideration. First one is based on a new ASIC which is under design. The second approach is based on existing GET ASICs and readout electronics. Initial compatibility tests of the SiPM sensors read out by AsAd front-end board were conducted at CEA-Saclay in April, 2018. We present the results of these measurements and conceptual design of the Cherenkov camera based on SiPM sensors and GET readout electronics.

Primary author: KUZNETSOV, Evgeny (University of Alabama in Huntsville)

Presenter: KUZNETSOV, Evgeny (University of Alabama in Huntsville)