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Title: Progress of Electron-Neutron Detector Array (ENDA)

Tuesday, 27 June 2023 13:00 (15 minutes)

Abstract-The origin of cosmic rays can be deciphered by accurately measuring the components and energy spectrum in the knee region. Extensive air shower (EAS) studies rely on information provided by secondary high energy hadrons, which generate evaporation neutrons when they interact with matter in the environment. In the early 21st century, the electron-neutron detector (EN-detector) was developed at the Institute for Nuclear Research of the Russian Academy of Science (INR RAS). The PRImary Spectrum Measurement Array (PRISMA) project was introduced to enhance the array capabilities of cosmic ray composition separation and improve measurement accuracy. Within the framework of Chinese-Russian cooperation, at the Large High Altitude Air Shower Observatory (LHAASO) at Mt. Haizi (4400 m a.s.l.) in Daocheng, Sichuan province, China, a proposal was launched to establish the EN-Detector Array (ENDA) composed of 400 detectors in area of $10,000m^2$ to measure cosmic rays up to 300 PeV. In 2018, a cluster, having 16 EN-detectors, at Tibet University (TU) in Lhasa, Tibet, China (3700 m a.s.l.) was built to test specification of the array. Since 2019, another cluster so called ENDA-16 has started running at LHAASO, and here we give the first result of thermal neutron distribution. After gaining experience from these previous works, since April 2023, we have successfully extended ENDA to ENDA-64 composed of 64 detectors in area of $1,000m^2$ at LHAASO to measure cosmic rays from 400TeV to 20 PeV, and we will describe status of ENDA-64 and hybrid detection of cosmic ray by using ENDA and LHAASO.

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