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Status of the ALPACA air shower array to explore sub-PeV gamma-ray sky in the southern hemisphere

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To unveil the origin of galactic PeV cosmic rays, observation of sub-PeV gamma rays is crucial. Sub-PeV gamma-ray astronomy is established in the northern hemisphere since the discovery of the Crab nebula >100TeV by the TibetASγ collaboration in 2019. ALPACA is a new air shower experiment under construction in Bolivia to explore the sub-PeV gamma-ray sky in the southern hemisphere for the first time. The ALPACA array consists of 400 scintillation counters covering 82,800 m^2 and underground muon detectors (MDs) covering 3,600 m^2 and will start operation in 2025. A prototype array ALPAQUITA with 97 scintillation counters is operating since 2022. The first 900 m^2 MD is in construction. In this contribution, we present the performance of the ALPAQUITA including the detection of the moon's shadow by charged cosmic rays and search for bright gamma-ray sources. The status of the first MD construction and a plan to complete the full ALPACA array are also presented.

Alternate track

1. Astro-particle Physics and Cosmology

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Yes

Primary author: SAKO, Takashi (University of Tokyo (JP))

Co-author: COLLABORATION, ALPACA

Presenter: SAKO, Takashi (University of Tokyo (JP))

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