



Contribution ID: 588

Type: Parallel Talk

ALPACA experiment: A new air shower array to explore the sub-PeV gamma-ray sky in the southern hemisphere

Saturday, 9 July 2022 17:30 (15 minutes)

In the last few years, gamma-ray astronomy opens a new window in the sub-PeV to PeV range inaugurated by the Tibet AS γ collaboration followed by the HAWC and LHAASO collaborations. Gamma rays at this energy range are expected to be emitted by the neutral pion decay produced in the interaction between cosmic-ray particles and the interstellar matter, hence it is important to identify the origin of cosmic rays. The successful three experiments are located in the northern hemisphere and they are not able to study the southern sky where potential interesting objects are known to exist.

Andes Large area PArticle detector for Cosmic ray physics and Astronomy (ALPACA) is a project to cover the southern sub-PeV to PeV sky using a new air shower array at the plateau of the Chacaltaya mountain at the altitude of 4,740 m in Bolivia. A 83,000 m² surface area is covered by 400 scintillating counters of 100cmx100cmx5cm^t. In addition to this conventional surface array, underground muon detectors covering total 3,700 m² allow a clear identification of muon components in air showers. This enables us to discriminate between hadronic and electromagnetic showers and to detect weak gamma-ray signal from the dominant isotropic hadronic showers. Using this array ALPACA will explore the sub-PeV to PeV gamma-ray sky first time in the Southern hemisphere. The prime target of ALPACA is to reveal PeV cosmic-ray accelerators presumably existing in the galactic plane, including the galactic center. A prototype array ALPAQUITA consisting of 97 surface counters and 900 m² muon detectors is now under construction and planned to start data taking in 2022. The next extension to the 200 counters and 3,700 m² muon detectors is scheduled in 2023. In this contribution, a general introduction to ALPACA, the current status of ALPAQUITA with its infrastructure, and extension plan after 2023 are presented.

In-person participation

No

Primary author: SAKO, Takashi (ICRR, University of Tokyo)**Co-author:** ALPACA COLLABORATION**Presenter:** SAKO, Takashi (ICRR, University of Tokyo)**Session Classification:** Astroparticle Physics and Cosmology**Track Classification:** Astroparticle Physics and Cosmology