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Half ALPACA and its sensitivity to sub-PeV gamma rays from the Galactic Center

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ALPACA is a project aimed at the wide field-of-view observation of cosmic rays and gamma rays with an 83,000 m^2 air shower array composed of approximately 400 surface scintillation counters and a large underground muon detector array, at an altitude of 4,740m near the Chacaltaya mountain in Bolivia. After a prototype air-shower array currently under construction, we plan to expand the array to 'half ALPACA', which covers an area of 83,000 m^2 with roughly 200 surface scintillation counters. Also, we will construct an underground muon detector array with an area of 4,000 m^2 that allows us to dramatically improve the sensitivity to gamma rays by discriminating gamma rays from cosmic rays based on the number of muons in air showers.

One of our main interests is the detection of gamma rays beyond 100 TeV from the Galactic center. In 2016, H.E.S.S observed the diffuse gamma-rays around the Galactic center. This data suggests that a cosmic-ray accelerator exists around it.

In this presentation, we report on the performance of half ALPACA, especially its sensitivity to sub-PeV gamma rays from the Galactic center, based on our detailed MC simulations.

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