

Performance of Air Shower Array with Surface Water Cherenkov Detectors

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Extensive Air Shower (EAS) array using scintillation detectors can observe cosmic rays with wide fields of view and high duty cycle. Since the timing and deposited energy of mainly secondary electrons and positrons incident on each detector are sampled accurately, an energy spectrum can be obtained with a small systematic error. However, the detection sensitivity of such EAS arrays is not as good as Imaging Atmospheric Cherenkov Telescope, especially with regard to TeV gamma ray point sources, due to its low angular resolution. Simply one way to improve angular resolution of EAS array is to increase the density of detectors, but it is costly. Water Cherenkov detector (WCD) is sensitive to secondary gamma-rays and may be more cost-effective than air shower arrays consisting of scintillation counters. We investigated whether the performance can be improved by adding surface WCD array to EAS array to observe a few -100 TeV gamma-rays using Monte Carlo simulation by CORSIKA and GEANT4.

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