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Study on the performance of photomultiplier tube in liquid scintillator detector

To observe celestial gamma rays above 100 GeV, we have developed a new type of SWCDA (Stereoscopic Water Cherenkov Detector Array) for the Extensive Air Shower (EAS) hybrid experiment. It consists of a liquid scintillator (LS) array and a stereoscopic water Cherenkov detector array. In the LS detector design, the collected scintillation light is transmitted to a Photomultiplier Tube (PMT), which converts the light signals into electrical signals. Therefore, the performance of the PMT plays an important role in determining the overall performance of the detector. We have assembled a test system to evaluate the PMT's performance by measuring the high voltage linearity, the dynamic range of PMT output, and the photoelectrons (PEs) distribution of a single particle. In this paper, three types of PMTs from North Night Vision Science Technology Research and HAMAMATSU chosen as candidates for the LS detector, have been studied.

Collaboration(s)

Author: ZOU, Yihuan

Co-authors: HUANG, Jing; CHEN, Ding; ZHANG, Ying; ZHAI, Liuming; MENG, Yu; HU, Kongyi; YU, Yanlin; LI, Yiyang

Presenter: ZOU, Yihuan

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