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Performance evaluation of 50cm PMTs for calibration of the Hyper-Kamiokande detector

Hyper-Kamiokande (HK) is the next-generation large-scale water Cherenkov detector currently under construction. It is planned to be an order of magnitude bigger than its predecessor, Super-Kamiokande (SK), and will house approximately 20,000 50-cm photomultiplier tubes (PMT) in the inner detector. In order to calibrate the HK detector precisely, it is necessary to understand the PMT response and establish a method to evaluate its performance before the installation. One of the necessary items for PMT performance evaluation is to study PMT response variation with respect to the light incident position. We are evaluating the position dependence of the 1 photo-electron charge distribution by injecting light into various positions on a PMT placed in a dark box.

In addition, though the PMTs will be operated in water in the actual HK detector, pre-installation calibration will be performed in air. Then it is necessary to systematically investigate the difference of the PMT responses between the cases it is placed in air and in water. We are currently building a setup to evaluate this difference. This poster presents the current status and future plans for these measurements.

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