



Contribution ID: 638

Type: Oral Presentation

New 50 cm Photo-Detectors for Hyper-Kamiokande (12' + 3')

Saturday 6 August 2016 16:30 (15 minutes)

Hyper-Kamiokande is a large water Cherenkov detector planned in Japan with improved photo-detectors. A 50 cm-diameter photomultiplier tube (PMT) was initially developed for Kamiokande, and improved for Super-Kamiokande, where a Venetian blind dynode was adopted for a wide acceptance. Further improvement with a high charge and time resolutions was achieved for Hyper-Kamiokande with a box-and-line dynode as an R12860 PMT by Hamamatsu Photonics K.K. The collection efficiency reaches 95%, superior to 67% of the PMT in Super-Kamiokande. It also gives a higher quantum efficiency of 30% at peak compared to a typical 22% for the Super-K PMT. In addition, we developed a 50 cm-diameter hybrid photo-detector (HPD), R12850 by Hamamatsu, with an avalanche diode that resulted in a higher resolution and detection efficiency. A preamplifier and high voltage module were designed to be equipped inside. Detailed performance evaluation was performed with a stability measurement in a water tank. Many accessories such as a cable, connector and cover, and alternative candidates of photo-detectors for Hyper-Kamiokande are being developed. The development and performance of the improved photo-detectors will be presented.

Authors: YOKOYAMA, Masashi (University of Tokyo); NISHIMURA, Yasuhiro (The University of Tokyo)

Presenter: NISHIMURA, Yasuhiro (The University of Tokyo)

Session Classification: Detector: R&D and Performance

Track Classification: Detector: R&D and Performance