

Performance of the Hyper-Kamiokande 20" PMT

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Hyper-Kamiokande, scheduled to start construction in 2020, will be the next generation water Cerenkov experiment in Japan, and will provide unprecedented sensitivity to study the oscillations of accelerator, solar and atmospheric neutrinos, search for proton decay and study the neutrinos coming from the explosion of a nearby supernova. In the baseline design, this massive new detector will be instrumented with 40k 20" PMT. We will report measurements of the performances of the candidate 20" PMTs in this presentation, as well as on-going studies to improve some of their properties.

The primary candidate ("Box & Line PMT") is the Hamamatsu R12860 PMT, which provides improved photo-detection efficiency, timing and charge resolution compared to the Hamamatsu R3600 PMT used in the current Super-Kamiokande experiment. We will present measurements of the properties of 140 of those PMTs, as well as a study of the uniformity (with respect to photon hit position and magnetic field) of the performances of 9 of them. We will also present studies to characterize and reduce the dark noise of this model.

An alternative candidate ("MCP PMT") is produced by North Night Vision Technology Co. and is based on a micro-channel plate system instead of the dynode system. We will present measurements of the performance of an improved model with better timing resolution, and their uniformity.

Primary authors: Dr BRONNER, Christophe (ICRR, The University of Tokyo); Dr NISHIMURA, Yasuhiro (RCCN, ICRR, The University of Tokyo); Mr XIA, Junjie (ICRR, The University of Tokyo); Mr MOCHIZUKI, Toshiki (ICRR, The University of Tokyo); Mr CHABERA, Mariusz (Warsaw University of Technology, NCBJ)

Co-authors: Mr TAKENAKA, Akira (ICRR, The University of Tokyo); Mrs SUGIMOTO, Rika (University of British Columbia)

Presenter: Dr BRONNER, Christophe (ICRR, The University of Tokyo)

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