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Multi-PMTs for IWCD neutrino detector

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Abstract: We are using multi-PMTs (mPMTs) as the photosensors for the Intermediate Water Cherenkov Detector (IWCD), the proposed near detector for the approved Hyper-Kamiodande experiment. The IWCD mPMT design has nineteen 3" PMTs enclosed in a water-tight pressure vessel, along with the associated electronics. The 3" PMTs provide excellent spatial imaging of the neutrino-induced Cherenkov light ring. This talk will describe the mechanical design of the mPMT, as well as the design of the digitizing electronics. Some of the key features of the mPMT design include:
i) new Hamamatsu 3" PMTs with improved timing resolution.
ii) UV-transparent acrylic dome with gel coupling between the PMTs and the acrylic.
iii) FADC digitization in order to handle the expected high rate of neutrino interactions during the J-PARC beam spill.
We will describe the results from several different prototype mPMTs we have constructed, as well as the plans for mass production.

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