

T583: Measurement of photo-sensor performance for T2K near detectors

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We have tested photon sensors that will be used for the near detector complex of the T2K neutrino oscillation experiment. The tested devices are multi-pixel avalanche photodiode, often called silicon photomultiplier or SiPM, which has an excellent photon counting capability. We test two types of devices; one is MRS-type SiPM made in Russia, and the other is multi-pixel photon counter developed by Hamamatsu Photonics.

We measure the light yield (Fig. 1) and the efficiency for a MIP using plastic scintillator read out with wavelength shifting fiber and these photo sensors. This is the same configuration as considered for the T2K near detector. The results shows that both of tested devices have sufficient performance for the detection of charged particles. Based on this measurement and other measurements of basic performance, this type of photo-sensor is selected as the baseline option for T2K near detectors.

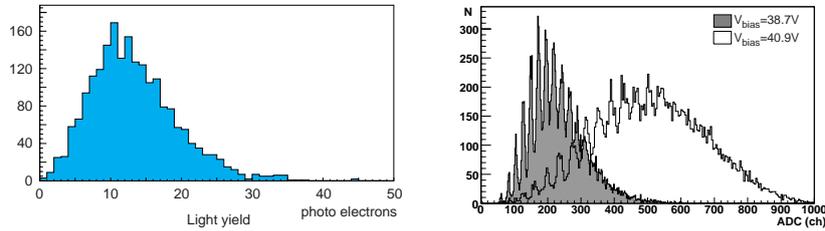


Figure 1: Response to MIP using plastic scintillator and wave length shifting fiber. Photo-electron distribution of HPK-MPPC (left) and ADC distribution of Russian MRS-SiPM (right).