

Calibration and Development of preamplifier for 8-inch Hybrid Photo Detector

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Direct measurement of internal properties of the Earth using neutrino has been discussed for more than 30 years. Discovery of the neutrino oscillations opened a new window for geoscience, as well as for particle physics. By measuring matter effect of neutrinos oscillations of atmospheric neutrinos that penetrate through the Earth, and by comparing them with our knowledge of Earth's density profile, we obtain electron density of Earth's core that constrains its chemical composition (Neutrino Spectrometry).

The most challenging part of the method is to build a mega-ton to giga-ton neutrino detector that has sensitivity in GeV energies. In-fill strings of IceCube-Gen2 can be one of the candidates that fulfill the condition.

We present our calibration studies of Hamamatsu Hybrid Photo Detector (Hamamatsu R12112) as a candidate of optical sensor for future large volume neutrino detectors. Our new preamplifiers for Hamamatsu R12122, newly developed to take maximum advantage of HPD's superior timing resolution and charge resolution will be introduced.

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