## Poster session 1 - Monday 4 July

P1.045 **Silicon photomultipliers characterization for future neutrino detectors**

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To answer remaining fundamental questions about the nature of the universe such as identification of the neutrino mass hierarchy and search for CP violation in the leptonic sector, next generation neutrino experiments are planning to build ultra-large scale detectors [1,2]. For neutrino detectors with large scale, it is a new challenge to design an affordable and effective large-area photon detection (PD) system. The PD system also needs to provide trigger on non-beam events such as proton decay, atmospheric and astrophysical neutrinos, as well as good event timing resolution. The silicon photomultipliers (SiPMs) are solid state low level light detectors which have compact size and relatively lower cost than conventional PMTs. They generally exhibit higher quantum efficiency (up to 80%) compared to the PMTs and as high gain as PMTs ($10^6$) at a low operating voltage below 100V. Together with light collection panels with wavelength shifter, SiPMs are highly attractive photo sensors for the new PD system.

The Deep Underground Neutrino Experiment (DUNE) [1], 40 kT liquid argon time projection chamber (LArTPC), plans to deploy tens of thousands of SiPMs. To be used for future LArTPCs, a comprehensive testing of SiPMs in cryostat is necessary since the datasheet provided by the manufactures in the market does not cover this temperature regime. The SiPMs are carefully tested to properly operate in cryostat for the expected lifetime of the future experiments. The characterization of the recently developed SiPMs by SenSL in cryostat including gain, dark count rate, cross-talk, after-pulse rate and long-term mechanical durability are shown. Characteristic studies on SiPMs from other vendors are also discussed.

[1] DUNE Collaboration, R. Acciarri et. al., Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE) Conceptual Design Report Volume 2: The Physics Program for DUNE at LBNF, arXiv:1512.0614.

[2] Hyper-Kamiokande Proto-Collaboration Collaboration, K. Abe et. al., Physics potential of a long-baseline neutrino oscillation experiment using a J-PARC neutrino beam and Hyper-Kamiokande, PTEP 2015 (2015) 053C02, [arXiv:1502.0519].