

Commissioning of liquid Xe detector with VUV-MPPC readout for MEG II experiment

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MEG II experiment is an upgrade of the MEG experiment which searches for the charged lepton flavor violating decay of muon, $\mu \rightarrow e\gamma$. Target sensitivity of MEG II is 6×10^{-14} , which is one order of magnitude better than MEG [1]. The engineering run of the MEG II detectors is planned in 2018.

Liquid xenon (LXe) detector is designed to measure the hit position, energy, and timing of 53MeV gamma-ray from $\mu \rightarrow e\gamma$ decay, and its resolutions must be good enough to achieve the target sensitivity.

For the upgrade of LXe detector, 216 PMTs (2-inch) on the gamma-ray entrance face were replaced to 4092 MPPCs ($12 \times 12\text{mm}^2$), aiming to achieve better granularity and uniformity of the scintillation readout. The position and energy resolution are expected to be improved by a factor of two. For this purpose, a large area VUV-sensitive MPPC was developed in collaboration with Hamamatsu Photonics [2].

In 2017, the construction of the detector was finished and the first operation of the LXe detector was carried out. The control and purification of LXe were successfully performed, and good stability of the light yield (i.e. purity) was demonstrated. The properties of the MPPCs operated in LXe was measured. Gamma-rays around the signal energy from muon decay were successfully detected, and the position and timing resolutions were being estimated. In this talk, the performance of the LXe detector including the performance of the MPPCs will be presented.

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