

Development of UV-sensitive MPPC for the upgrade of liquid xenon detector in MEG experiment

Tuesday 10 September 2013 18:00 (3 hours)

A major upgrade of the MEG experiment is planned. The liquid xenon gamma-ray detector will be upgraded by replacing a part of the current 2-inch PMTs by smaller photosensors such as silicon photomultipliers (SiPMs). The energy and position resolutions are expected to be improved due to better granularity, especially for the events where gamma-ray converts near the incident face.

An MPPC which is sensitive to the scintillation of liquid xenon and has large active area of $12 \times 12 \text{mm}^2$ is being developed in collaboration with Hamamatsu Photonics.

It is found in prototyping tests that sufficiently good performance is already achieved such as a high photon detection efficiency (PDE) of 17% and single photon counting capability, and that the long tail of large-area MPPC can be shortened by subdividing the sensor area and connect them in series in order to reduce the overall capacitance.

Recently Hamamatsu Photonics has improved basic MPPC structure. This will be applied to the UV-sensitive MPPC too, and thus the performance is expected to be further improved.

In this presentation, the performances of the UV-sensitive MPPC is presented.

A development of the MPPC-related items such assembly techniques, high-density vacuum feedthrough and readout electronics is also presented.

Primary author: Mr KANEKO, Daisuke (University of Tokyo)

Presenter: Mr KANEKO, Daisuke (University of Tokyo)

Session Classification: Poster, BBQ & Drinks