

MPPC for calorimetry application

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We discuss possibility of MPPC for calorimetry application in next generation. The MPPC (Multi-Pixel Photon Counter produced by Hamamatsu Photonics K.K.) is a single photon sensitive device which consists of a large number of Geiger-mode APDs. The MPPC is designed to be a good time resolution as well as high gain of $10^5 \sim 10^6$. It is expected a good photon detection efficiency of about 50% for blue and green lights. It is compact and works in magnetic field at lower bias voltages than standard APD's.

In high-energy nucleus-collisions, a huge amount of charged and neutral hadrons are produced, as well as photons and leptons. To measure photons in such a condition, an electromagnetic calorimeter is a useful device. However enormous hadrons may disturb the measurements. To measure a weak signal of photons, separation of the photons from neutral hadrons becomes critical. Therefore, the time resolution of calorimeter elements becomes important function for precise photon measurements. We have tested the MPPC (model S10362-33-025C with 14400 pixels per $3 \times 3 \text{ mm}^2$) at room temperature for single photon energy resolutions at various operational bias voltages. We will present the performance as a function of bias voltage and operating temperature down to -25 degrees, and discuss feasibility of the MPPC for calorimetry application.

Keywords

calorimeter, photon, MPPC

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