

Current status of Hamamatsu Si detectors for collider experiments

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Hamamatsu photonics has been producing many sensors like a photo-multiplier tube to HEP (high energy physics) experiments. Recently our Si sensors are used in many collider experiments. In LHC project, our SSD (Silicon strip detector) and Si-APD (Avalanche photodiode) were installed in CMS and ATLAS detectors, and contributed to the Nobel-Prize winning discovery of the Higgs boson in 2013. For the upgrade to the HL-LHC (High Luminosity LHC) scheduled for 2026, Hamamatsu photonics will supply new 8 inch silicon pad sensors and new SSDs.

The MPPC, which is a part of the SiPM family, was developed about 10 years ago. The most important feature is its photon counting capability due to high gain and low noise, but the MPPC has many additional features such as compact size, low operation voltage, robustness, high detection efficiency, and immunity to magnetic field. Many scientists have been using MPPCs for HEP experiments like T2K experiment and MEG-II experiment. And new MPPCs are considered for the new detectors in HL-LHC.

In this presentation, we will discuss the feature of our new silicon sensors and MPPCs for collider experiments. And we will talk about new technique of MPPCs for HEP experiments.

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