

Characterisation of the Hamamatsu silicon photomultiplier arrays for the LHCb Scintillating Fibre Tracker Upgrade

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In the context of the LHCb detector upgrade, during the long shutdown of LHC (2019/2020), the complete tracking system will be replaced to cope with the increased luminosity and trigger less readout scheme. A large area (300m²) scintillating fibre tracker (SciFi) with more than 500K channels and 250um readout pitch is under construction. The silicon photomultiplier used for the read-out provide high photon detection efficiency, low correlated noise (optical cross-talk and after-pulse), short recovery time and withstand a high neutron fluence. The Hamamatsu photo-detectors selected in November 2016 have been characterised before and after irradiation with neutrons and protons. We will focus in this talk on the study of the performance of these devices in the context of the LHCb SciFi application regarding the single photon detection capability after irradiation.

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