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Timing Performance of an Ultra Compact Radiation-Hard Calorimeter Concept: RADiCAL

Wednesday, 30 November 2022 18:00 (20 minutes)

We are conducting R&D on advanced calorimetry techniques based on scintillation and wavelength-shifting technologies and photosensor (SiPM and SiPM-like) technology. In particular, we are focusing our attention on ultra-compact radiation hard EM calorimeters, based on modular structures (RADiCAL modules) consisting of alternating layers of very dense absorber and scintillating plates, read out via radiation hard wavelength shifting (WLS) solid fiber or capillary elements to photosensors positioned either locally or remotely, depending upon their radiation tolerance. The RADiCAL modules provide the capability to measure simultaneously and with high precision the position, energy and timing of EM showers. The application of this concept will address the challenges of providing high performance calorimetry in future hadron collider experiments under conditions of high luminosity and high radiation (FCC-hh environments).

In this talk we show the results obtained for the performance in timing resolution under an electron test beam of 28 and 16 GeV energies conducted in Dec'21 and upcoming in Jun'22 at Fermi National Laboratory (Fermilab) using several capillary technologies.

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