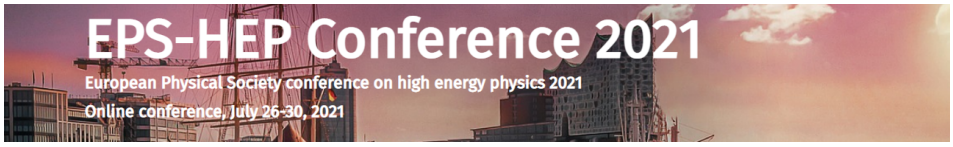

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New radiation-hard scintillators for FCC Detectors

Future circular and linear colliders, as well as the Large Hadron Collider in the High-Luminosity era, have been imposing unprecedented challenges on the radiation hardness of particle detectors that will be used for specific purposes e.g. forward calorimeters, beam, and luminosity monitors. We performed research on the radiation-hard active media for such detectors, particularly calorimeters, by exploring intrinsically radiation-hard materials and their mixtures. The initial samples that we probed were thin plates of Polyethylene Naphthalate (PEN) and Polyethylene Terephthalate (PET) and thin sheets of HEM. The previous studies indicate promising performance under high radiation conditions. We will report on the necessary process of mixing the PEN and PEN for optimized scintillation and signal timing properties preserving the high radiation resistance. Recently we developed a new plastic scintillator material. The scintillation yield of SX sample was compared to a BGO crystal using a setup with 90Sr source and a Hamamatsu R7525-HA photomultiplie tube (PMT). The SX was measured to yield roughly 50% better light production compared to the BGO crystal sample SX was irradiated at the CERN PS radiation facility with 24 GeV/c protons. The samples received a fluence of 1.2 x 1015 p/cm2 which corresponds to 4 x 105 Gy radiation doses. The comparison of the transmission spectra of SX sample before and after the irradiation exhibits a loss of roughly 7% light transmission after 4 x 105 Gy proton irradiation

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