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Development of Radiation Hard Scintillators

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Modern high-energy physics experiments are in ever increasing need for radiation hard scintillators and detectors. In this regard, we have studied various radiation-hard scintillating materials such as Polyethylene Naphthalate (PEN), Polyethylene Terephthalate (PET), our prototype material Scintillator X (SX) and Eljen (EJ). Scintillation and transmission properties of these scintillators are studied using stimulated emission from a 334 nm wavelength UV laser with PMT before and after certain amount of radiation exposure. Recovery from radiation damage is studied over time. While the primary goal of this study is geared for LHC detector upgrades, these new technologies could easily be used for future experiments such as the FCC and ILC. Here we discuss the physics motivation, recent developments and laboratory measurements of these materials.

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