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Simulation of PEN materials for future use in argon-based detectors

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Liquid argon-based scintillation detectors are essential for dark matter searches and neutrino physics. The light detection in such detectors is still an object of research for large volumes. Liquid argon scintillation light is generated in the vacuum ultraviolet region, so it can undergo Rayleigh scattering and absorption before it gets detected. Using wavelength shifters may improve the light collection by converting the scintillation light to wavelengths that are less susceptible to such effects. Polyethylene Naphthalate (PEN) plastic scintillator, an optically transparent thermoplastic polyester commercially available, is a potential self-vetoing structural material in low-background physics experiments. In this work, we investigate the efficiency of PEN sheets using Geant4 simulations. These results will be used to guide future experimental setups with the same goal.

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