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Transparent Thermoplastic Acrylic Scintillator

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Active shielding is essential in modern experimental particle physics, it provides a robust means to cross-check the potential signal of the main detector. The liquid scintillator (LS) is widely used in neutrino and dark matter physics. Their high light yield, long term stability and potential for mass production makes them an ideal material for large scale detectors. However, the production of high purity scintillators is not trivial and the liquid scintillator has to be contained in UV-transparent containers that leads to design constraints. We propose a new type of veto scintillator by doping LS into acrylic. Acrylic is a commonly used material in experimental particle physics with well-known properties. Such acrylic scintillators have the potential to be mechanically strong, inexpensive and stable. In addition, by doping different rare earths one can build multilayer detectors that enable particle discrimination.

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