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Demonstration of a Lightguide Detector for Liquid Argon TPCs
LEONARD BUGEL, Massachusetts Institute of Technology, J. CONRAD, C. IGNARRA, B. JONES, T. KATORI, T. SMIDT, MIT, H. TANAKA, BNL — We report demonstration of light detection in liquid argon using an acrylic lightguide detection system. This opens the opportunity for development of an inexpensive large area light collection system for large liquid argon time projection chambers. The guides are constructed of acrylic, with TPB embedded in a surface coating with a matching index of refraction. We study the response to early scintillation light produced by a 5.3 MeV alpha. We measure responses from 7 to 8 PE on average, compared to an ideal expectation of 10 PE on average. We estimate the attenuation length of light along the lightguide bar to be greater than 0.5 m. The coating response and attenuation length can be improved; we show however, that these results are already sufficient for triggering in a large detector.

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