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A Demonstration of Light guides for Light Detection in Liquid Argon TPCs

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Content :

Liquid Argon (LAr) Time Projection Chambers (TPCs) are a developing technology that are becoming a popular choice for neutrino and dark matter experiments due to the low cost of the LAr as a target material and the high signal efficiency and background rejection that these detectors can achieve. When excited by a passing charged particle created in a neutrino interaction, argon produces scintillation light at 128nm. There are currently several types of systems in place for detecting this light. Most involve shifting the light using tetraphenyl butadiene (TPB), resulting in visible light which is detected by a PMT.

I will discuss our work on a new system under development for light detection in LAr which uses acrylic lightguides. The lightguides are coated with a thin film consisting of TPB embedded in polystyrene. This system could provide a solution to some of the issues we face in scaling existing systems for a larger future LAr detector. Though we are only in the preliminary stages of this R, we have shown that the results are already sufficient for triggering.

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