

Abstract Submitted
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PIXeY—an R&D Prototype Detector For Optimizing Energy And Spatial Resolution¹ N.E. DESTEFANO, W.R. ZIMMERMAN, M. GAI, UConn, E.P. BERNARD, N.A. LARSEN, S.B. CAHN, A. CURIONI, A. LYASHENKO, J.A. NIKKEL, Y. SHIN, A.H. YOUNG, D.N. MCKINSEY, Yale — Noble liquid scintillators are useful detection materials for dark matter searches, neutrinoless double beta decay searches, and gamma ray Compton imaging, exhibiting good energy and spatial resolution, as well as gamma/neutron discrimination. We have constructed a prototype detector “PIXeY” (Particle Identification in Xenon at Yale), a two phase liquid xenon detector, to better optimize the technology. We simulated the potential variation throughout the detector in order to determine optimal liquid level placement. Grids were constructed from wire mesh to optimize both light collection efficiency and field uniformity. In addition, high quantum efficiency Hamamatsu 8778 PMTs are being used together with charge-light anti-correlation techniques to improve the energy resolution, with the design goal of an energy resolution of 1% (σ/E) at 1 MeV. Once completed, PIXeY will serve as a platform for future improvements including multiple optical volumes and single wire readout. This talk will provide a progress report on this research subject.

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