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Construction of a Cryogenic CsI(pure) Scintillation Detector Prototype for Low Energy Neutrino Registration

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This talk presents the construction and testing of a modular scintillation detector prototype designed to register low-energy neutrino-induced recoil electrons with sub-keV thresholds (<1 keV). The developed detector features a scalable architecture based on 64-channel layers of scintillation modules, which will contain four compact CsI(pure) crystals coupled to SiPM matrices. Due to a high light yield of up to 120 photons/keV, the system is capable of reaching an energy detection threshold as low as 100 eV. The structure of the multi-channel detector alongside the design of the dedicated cryostat will be demonstrated. Systematic studies of both internal and external optical crosstalk and SiPM dark count rates at cryogenic temperatures are covered. The results prove the feasibility of a stable 6 p.e. detection threshold. Finally, recent background measurements in the low-background laboratories of the Baksan Neutrino Observatory will be covered.

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