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Cryogenic inorganic scintillator for the detection of non-standard neutrino interactions and low-mass dark matter

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Inorganic scintillating detectors are widely used in the detection of dark matter and neutrinos due to their relatively high light yields and easy light readout with PMTs at room temperature. Our prototype, pure CsI coupled with SiPMs at cryogenic temperature, can achieve a much higher light yield. The high light yield illustrates the great potential of this novel combination for neutrino and low-mass dark matter detection, particularly at accelerator-based neutrino sources, where the random background can be highly suppressed by requiring coincident triggers between SiPMs and beam pulse timing signals. The scientific motivations, key ingredients, prior work, future plans, and sensitivities will be presented in detail.

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