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Scintillation Characteristics of an Undoped CsI Crystal with SiPM Readout for Dark Matter Detection

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Undoped CsI crystals are promising target materials for dark matter detection due to their high scintillation light yield at cryogenic temperatures. At liquid nitrogen temperature (~77 K), they emit more than 80,000 photons/MeV, making them suitable for detecting low-energy nuclear recoils. In this study, we investigated the scintillation properties of an undoped CsI crystal coupled with two silicon photomultipliers (SiPMs), which are compact and compatible with low-temperature operation. We measured the temperature-dependent light yield and scintillation decay time from room temperature down to 77 K. Based on the measured performance, we also evaluated the dark matter detection sensitivity of the undoped CsI–SiPM system. In this presentation, we will discuss the experimental results and assess the potential of this detector configuration for future low-threshold dark matter searches.

Collaboration you are representing

Author: KIM, Wonkyung (University of Science & Technology (UST), IBS School)

Co-authors: Dr LEE, Hyeyoung (Center for Exotic Nuclear Studies, Institute for Basic Science); Dr KIM, Kyungwon (Center for Underground Physics, Institute for Basic Science); Prof. KO, Young Ju (Department of Physics, Jeju National University); Dr JEON, JinA (Center for Underground Physics, Institute for Basic Science); Prof. KIM, Hong Joo (Department of Physics, Kyungpook National University); Prof. LEE, Hyunsu (Center for Underground Physics, Institute for Basic Science)

Presenter: KIM, Wonkyung (University of Science & Technology (UST), IBS School)

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