

Particle discrimination with low-temperature detectors based on CaMoO₄ scintillating crystals

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Simultaneous measurements of heat and scintillation light signals from several ¹⁰⁰Mo-enriched, ⁴⁸Ca-depleted ⁴⁰Ca¹⁰⁰MoO₄ crystals have been performed at millikelvin temperatures using metallic magnetic calorimeters (MMCs). Each scintillating crystal was equipped with heat and light detectors, with the latter consisting of a Ge wafer placed near the crystal to collect the scintillation photons. The high energy resolution and fast response of the MMCs allowed us to discriminate β/γ - and α -induced events in the ⁴⁰Ca¹⁰⁰MoO₄ crystals by using two discrimination methods: by estimation of the ratio of light and heat pulse heights, or by pulse-shape analysis of the heat signals (difference in rise and decay times). Measurements were performed at the 700-m deep Yangyang underground laboratory (Y2L) with the setup of AMoRE-Pilot, that is the pilot phase of the AMoRE (Advanced Mo-based Rare process Experiment) project aiming to search for neutrinoless double beta decay of ¹⁰⁰Mo.

Has accepted

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