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# A metallic magnetic calorimeter with scintillation crystal for rare event search experiment

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The metallic magnetic calorimeter (MMC) operates at tens of millikelvin temperatures, and measures temperature increases caused by particle interactions in detectors. Calorimetric detection of heat and light signals of scintillation crystals using MMCs is a promising detection technique for rare event search experiments because of its high energy resolution, low energy threshold, and particle discrimination performances. We have developed detectors consisting of $CaMoO_4$ scintillation crystals and MMCs for the AMoRE (Advanced Mo-based Rare process Experiment) experiment which is searching for neutrinoless double beta decay ($0\nu\beta\beta$) of $^{100}$Mo. A prototype detector has shown a FWHM energy resolution of 9 keV at 2.6 MeV (close to the 0νββ Q-value of $^{100}$Mo) and a 20 $\sigma$ separation power for alpha-induced background events. These performances enable a negligible-background experiment up to tens of kg scale detectors. We present measurement concept and performances of the prototype detector tested at an above-ground laboratory. Also, current status of the AMoRE-pilot experiment with 1.5 kg enriched $CaMoO_4$ crystal detectors at the Yang-Yang underground laboratory will be presented.

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