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## Development of MMC based combined photon and phonon detector for rare event searches

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In the search for rare events, a simultaneous measurement of photons and phonons produced after an event in a scintillating crystal operated at mK temperatures enables an efficient background rejection. This is due to the fact that the light yield depends on the mass, allowing for particle discrimination. This approach can be used for both neutrinoless double beta decay and dark matter searches. We present the design of a combined photon and phonon detector based on metallic magnetic calorimeters (MMCs). Simulations predict an energy resolution of  $\Delta E_{\text{FWHM}} < 10$  eV, a signal risetime of  $\tau_0 < 50$   $\mu\text{s}$  and a signal decay time  $\tau_1 < 10$  ms for the photon detector and  $\Delta E_{\text{FWHM}} < 100$  eV,  $\tau_0 < 200$   $\mu\text{s}$  and  $\tau_1 < 10$  ms for the phonon detector. The combined photon and phonon detector concept will be described with emphasis on the tower design of a multi-crystal setup. The challenges of the fabrication steps will be discussed. In addition, we will present the results of characterizations of first prototypes of such photon and phonon detectors.

### Less than 5 years of experience since completion of Ph.D

N

### Student (Ph.D., M.Sc. or B.Sc.)

N

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