Compact heat and light detection system for 1-cm3 scintillating crystals

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The use of scintillating crystals as a main target material of low-temperature calorimeters is advantageous in rare event search experiments. With heat signals, a low-temperature calorimeter yields high energy resolution and particle identification efficiency by their pulse shapes. Furthermore, simultaneous detection of heat and light signals may provide clear background rejection tools using relative heat/light signal amplitude. We developed a compact detector system to investigate the phonon and scintillation properties of various crystals. It is designed to measure heat and light signals from a 1 cm3 crystal with readout via metallic magnetic calorimeters (MMC). A gold film evaporated on a side of a crystal serves as phonon collector that is thermally connected to the MMC sensor. A light detector was constructed, similarly, with a thin square Ge wafer of 1.5 x 1.5 x 0.05 cm3. Recent results using calcium molybdate (CaMoO4) and lithium molybdate (Li2MoO4) will be reported.