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CALDER: Cryogenic light detectors for $\bar{\nu}$ neutrino and dark matter searches

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Large-mass arrays of bolometers proved to be good detectors for Neutrinoless Double Beta Decay ($0\nu 2\beta$) and Dark Matter searches.

CUORE and LUCIFER are bolometric $0\nu 2\beta$ experiments which will start to take data in 2016 at Laboratori Nazionali del Gran Sasso in Italy. The sensitivity of CUORE could be increased by removing the background due to α particles, by detecting the small amount of Cherenkov light (100 eV) emitted by the β s' signal and not by α s. LUCIFER could be extended to detect also Dark Matter, provided that the background from β/γ particles (100 eV of scintillation light) is discriminated from nuclear recoils of about 10 keV energy (no light). CALDER is a new project to develop light detectors for CUORE, LUCIFER and similar bolometric experiments. The goal is to obtain detectors with an active area of $5 \times 5 \text{ cm}^2$ (the face of bolometric crystals), operating at 10 mK, and with a baseline resolution better than 20 eV. We have chosen to develop phonon-mediated devices using superconducting MKIDs (Microwave Kinetic Inductance Detectors). We present the first results and the perspectives of the project.

Collaboration

CALDER Collaboration.

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