

Lithium molybdate scintillating bolometers for double beta decay

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The LUMINEU project has recently set up a technology for the development of high-performance scintillating bolometers containing the nuclide ^{100}Mo , in the framework of the R&D activities towards the proposed tonne-scale neutrinoless double beta decay experiment CUPID. Using in particular $\text{Li}_2^{100}\text{MoO}_4$ detectors, high energy resolution (5-6 keV FWHM at 2615 keV), excellent alpha background rejection (>99.9%) and extreme radiopurity (below 0.005 mBq/kg U/Th intrinsic activity) have been demonstrated in multiple tests with remarkable reproducibility. Moreover, with only 0.1 kg x y of ^{100}Mo exposure, the measured two-neutrino double beta decay half-life is one of the most precise values ever reported. As a follow-up of this activity, a demonstrator named CUPID-Mo is collecting data in the Modane underground laboratory in France. CUPID-Mo consists of twenty 0.2-kg ^{100}Mo -enriched Li_2MoO_4 scintillating bolometers (containing more than 2 kg of ^{100}Mo) to be operated for at least 0.5 yr, providing a sensitivity to ^{100}Mo larger than 10^{24} yr. CUPID-Mo is a very important demonstrator for the implementation of CUPID, as the CUPID-Mo detectors follow closely the configuration chosen for the baseline of CUPID.

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Abstract Title

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