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CUPID: a next generation bolometric neutrinoless double beta decay experiment

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CUPID is a next-generation tonne-scale bolometric neutrinoless double beta decay experiment to probe the Majorana nature of neutrinos and discover Lepton Number Violation if the effective neutrino mass is greater than 10 meV. CUPID will be built on experience, expertise and lessons learned in CUORE, and will be installed in the current CUORE infrastructure in the Gran Sasso underground laboratory. The CUPID detector technology, successfully tested in the CUPID-Mo experiment, is based on scintillating bolometers of Li_2MoO_4 enriched in the isotope of interest ^{100}Mo . In order to achieve its ambitious science goals, CUPID aims to reduce the backgrounds in the region of interest by a factor 100 with respect to CUORE. This performance will be achieved by introducing the high efficiently alpha/beta discrimination demonstrated by the CUPID-0 and CUPID-Mo experiments, and using a high transition energy double beta decay nucleus such as ^{100}Mo to minimize the impact of the gamma background. CUPID will consist of about 1500 hybrid heat-light detectors for a total isotope mass of 250 kg. The CUPID scientific reach is supported by a detailed and safe background model that uses CUORE, CUPID-Mo and CUPID-0 results. The required performance in terms of energy resolution, alpha rejection factor and crystal purity have already been demonstrated and will be presented.

Collaboration name

CUPID

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