

New Results from the CUPID-Mo demonstrator on the ^{100}Mo $0\nu\beta\beta$ decay half-life

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CUPID-Mo served as a successful demonstrator experiment for CUPID (CUORE Upgrade with Particle ID), the planned next-generation upgrade of the first ton scale cryogenic calorimetric $0\nu\beta\beta$ decay experiment, CUORE (Cryogenic Underground Observatory for Rare Events). CUPID-Mo was operated at Laboratoire Souterrain de Modane in France as an array of 20 enriched $\text{Li}_2^{100}\text{MoO}_4$ (LMO) cylindrical scintillating crystals ($\sim 200\text{g}$ each) each featuring a Ge light detector (LD) all at $\sim 20\text{ mK}$. The LMOs and LDs were instrumented with NTD thermistors allowing for the collection of both heat and scintillation light. This dual mode of energy collection allows for α events to be distinguished from β/γ events, significantly reducing the background from degraded α s in the heat channel. CUPID-Mo has a demonstrated energy resolution of $\sim 7\text{ keV}$ (FWHM) at 2615 keV , complete $\alpha/(\beta/\gamma)$ discrimination and very low radioactive contamination. Here we report the results of an analysis of the full CUPID-Mo exposure, detailing improved analysis techniques and present an updated limit on the $0\nu\beta\beta$ decay half-life for ^{100}Mo . We also will describe the status of other ongoing analysis efforts underway with the CUPID-Mo dataset.

Reference to paper (DOI or arXiv)

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