Contribution ID: **107** Type: **Oral**

Transition-edge sensors with multiplexing readout for the CUPID experiment.

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CUPID is a proposed next-generation experiment that will search for neutrinoless double-β (0νββ) decay in ^{100}Mo using ~1600 $Li_2{}^{100}MoO_4$ scintillating crystals operated as low-temperature calorimeters close to ~10mK. It will leverage the crystal's energy loss mechanism to tag particle type by simultaneously measuring the thermal and scintillation signals. We will use an auxiliary low-temperature calorimeter to detect light with high photon collection efficiency. The light detectors must have a very low energy threshold ⊠(100eV) and good timing resolution < 1 ms to tag α background and 2νββ pile-up events in the region of interest, and are crucial to reach the CUPID background goal of <1E-4 counts/(keV.kg.yr) for its baseline design. In this talk, I will briefly discuss the R&D status of a future upgrade using a novel Iridium/Platinum bilayer superconducting transition-edge-sensor (TES) on a large area dielectric wafer (Si/Ge), acting as light-detectors. CUPID is under development at the 250 kg level but is already looking to the next stage with 1 ton of ^{100}Mo (CUPID-1T). Scaling the next generation of crystalline detectors to the ton size requires ten thousand channels or more; efforts to decrease this wire density using frequency-division multiplexing are ongoing. These efforts still require technical solutions to demonstrate performance at operating temperature; systems must also adhere to stringent noise, crosstalk, and radiopurity constraints. I will discuss our efforts toward these technical solutions.

Early Career

Yes

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