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Characterization of the QUartz Photon Intensifying Detector (QUPID)

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The sensitivity of the current generation of Noble Liquid Dark Matter detectors is limited by background events originating from radioactivity in the detector materials, especially from the photomultiplier tubes. In this talk, I will present the QUartz Photon Intensifying Detector (QUPID), a novel concept for a new style of photodetector based on the design of Hybrid APDs and made nearly entirely out of radiopure quartz. The radioactivity of the QUPID is at least an order of magnitude lower than conventional phototubes. By using QUPIDs, future noble liquid detectors will have drastically lower background levels, corresponding to much better sensitivities for dark matter detection. The Hybrid APD design also provides very high linearity, single photon counting, and good time response. I will discuss the development and testing of the QUPID, specifically for use in liquid xenon, along with the detection of xenon scintillation light by the QUPID.

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