

Progress Toward a Superfluid 4He Detector for Light Dark Matter (HeRALD)

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We report recent progress toward using superfluid 4He for nuclear recoil direct detection, as part of the overall TESSERACT pre-Project R&D effort. The quantum evaporation signal pathway allows both a low threshold and the possibility of rejecting the primary low-energy background (heat-only events in the calorimetry itself) through multi-channel coincidence. We have recently demonstrated the key technology of Cesium-based superfluid film-stopping, newly allowing measurements of 4He scintillation and evaporation signal yields at sub-keV energies.

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