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Low-mass Dark Matter Direct Detection with TESSERACT

Wednesday 23 August 2023 17:50 (20 minutes)

Despite decades of experimental efforts, the direct detection of a dark matter (DM) signal has remained elusive. Leading experiments typically have sensitivity to DM candidates in the mass range from 10 GeV to O(1 TeV), therefore a sensitive detection method to probe the sub-GeV mass range is highly motivated. The TESSERACT collaboration aims to use two fully defined sensor technologies (SPICE and HeRALD) to explore the mass range down to 10 MeV. All target materials will be read out using common Transition Edge Sensor (TES) technology. TESSERACT will have sensitivity to DM candidates interacting through nuclear recoils (NR) and electron recoils (ER). SPICE will utilize polar crystals such as GaAs, with the best sensitivity to DM mediated by a dark photon. HeRALD will be equipped with a superfluid 4He target: providing a light but dense target sensitive to low-energy nuclear recoils. In this presentation, we will discuss the current planning phase of TESSERACT and the progress made in realizing this goal, in addition to sharing details about the potential physics reach of this project.

Collaboration / Activity

TESSERACT

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