

Search of light Dark Matter with TESSERACT experiment at Laboratoire Souterrain de Modane

Tuesday 26 August 2025 16:00 (20 minutes)

TESSERACT (Transition Edge Sensor with Sub-Ev Resolution and Cryogenic Targets) is an experiment lead by American, French and Swiss teams aiming at looking for Light Dark Matter in the Laboratoire Souterrain de Modane.

Several cryogenic targets will be used in order to be sensitive to different DM interactions, allowing to explore both Electronic Recoils Dark Matter (ERDM) and Nuclear Recoils Dark Matter (NRDM) in the sub-GeV range, down the keV scale

Each of these targets are also designed to mitigate the so-called Low Energy Excess, a background from unknown source seen by every low-threshold cryogenic experiment. The three detector technologies are HeRALD, a superfluid Helium experiment, SPICE, using polar crystal, and Ge/Si bolometers. These detectors will be equipped with Transition Edge Sensor cooled at 14 mK, allowing to reach very low energy thresholds.

In this presentation, I will make an overview of the TESSERACT technologies, talk about the recent improvements, and make an emphasis on the Ge bolometer that is currently being developed in France, that has the specificity to assess both heat and ionization. Thanks to this double measurement, at low voltage we are able to take advantage of the Ionization yield to discriminate electronic recoils and nuclear recoils, and at high voltage to boost the heat signal to reach a single phonon resolution.

Collaboration you are representing

TESSERACT

Author: VITTAZ, Paul (CNRS - IP2I)

Presenter: VITTAZ, Paul (CNRS - IP2I)

Session Classification: Dark Matter and Its Detection

Track Classification: Dark Matter and Its Detection