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DoubleTES detectors to investigate the CRESST low energy background: results from above-ground prototypes

The CRESST experiment utilises advanced cryogenic detectors constructed with different types of crystals equipped with Transition Edge Sensors (TESs) to measure signals of nuclear recoils induced by the scattering of dark matter particles in the detector.

In recent times, the sensitivity of low-mass direct dark matter searches has been limited by unknown low energy backgrounds close to the energy threshold of the experiments known as the low energy excess (LEE). In CRESST, this low energy background manifests itself as a steeply rising population of events below 200 eV. A novel detector design named doubleTES using two identical TESs on the target crystal was studied to investigate the hypothesis that the events are sensor-related. We present the first results from two such modules, demonstrating their ability to differentiate between events originating from the crystal's bulk and those occurring in the sensor or in its close proximity.

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