

Dark matter annual modulation with CUORE experiment

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Summary

Experiments with a non-null background in the region of interest for particle dark matter direct detection can search for it exploiting the expected signal annual modulation signature.

A search for annual modulation will be possible with the CUORE (Cryogenic Underground Observatory for Rare Events) experiment.

CUORE is a ton-scale neutrinoless double beta decay experiment based on TeO₂ cryogenic bolometers that is currently in the last construction stage at the Gran Sasso National Laboratory (LNGS) in Italy.

Thanks to its large mass (988 TeO₂ bolometers arranged in 19 towers for a total active mass of 741 kg), to its low energy threshold and to its projected stability on working conditions, CUORE can extend its physics potential also to study dark matter.

Waiting for CUORE commissioning, all the necessary tools for a low energy and subsequent annual modulation

analysis have been developed and tuned using data acquired with CUORE-0, a single-tower CUORE prototype recently concluded. They include a new low-threshold trigger, low energy calibration, event selection, efficiencies evaluation and stability checks.

Preliminary results of the annual modulation study on the CUORE-0 data and prospects for CUORE will be discussed here.

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