

Cosmic activation of CRESST's CaWO₄ crystals

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The CRESST experiment searches for dark matter induced nuclear recoils inside CaWO₄ based cryogenic calorimeters at the Laboratori Nazionali del Gran Sasso (LNGS) in Italy. To reliably identify a potential signal, a precise understanding of its background budget is crucial.

A potentially important background category are “cosmogenics”: radionuclides produced via interactions with cosmic rays, mainly during the crystal production at surface facilities. Albeit CaWO₄ is a well-established calorimetric material, no systematic study of its susceptibility for cosmic activation existed so far.

In this contribution, we will first report the exposure profile of CRESST's in-house grown CaWO₄ crystals to cosmic rays. Then we will identify the most prominent cosmogenics via ACTIVIA calculations. Afterwards we discuss the expected background spectrum based on Geant4 simulations and compare it to measurements. Finally, we give an outlook on ongoing cross-checks with alternative activation codes.

Reference to paper (DOI or arXiv)

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Primary author(s) : KLUCK, Holger (Vienna Univ of Technology)

Presenter(s) : KLUCK, Holger (Vienna Univ of Technology)

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