

Background simulations for CROSS experiment

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The observation of neutrinoless double beta ($0\nu 2\beta$) decay would give information on lepton number violation, as well as on the neutrino mass and nature (Dirac or Majorana particle). The CROSS project (Cryogenic Rare event Observatory with Surface Sensitivity) uses bolometers with embedded with Mo100 and Te130 isotopes, which are susceptible to decay through this hypothetical process. The CROSS bolometers are installed in a dedicated cryogenic facility in the Canfranc underground laboratory, Spain. As the main challenge of an experiment aimed to detect $0\nu 2\beta$ decay is to reduce the background contribution in the region of interest (ROI), the CROSS experiment is developing bolometers capable to discriminate the background from surface alpha and beta interactions. Moreover, to tag and eliminate muon-related events, the experimental setup includes a heavy passive shielding and an active muon veto system made of plastic scintillators. Background modeling is essential in experiments searching for rare processes. For that purpose, a new MonteCarlo simulation of the CROSS experiment has been designed using the GEANT4 toolkit. This simulation has lead to calculate several background contributions in the ROI. Furthermore, it has allowed to develop targeted strategies to reduce background by applying event selections based on energy depositions observed across different detectors.

Poster prize

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Collaboration (if any)

CROSS collaboration

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