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Identifying Surface Background Events in DEAP-3600

Wednesday 23 August 2023 16:30 (20 minutes)

The DEAP-3600 detector is a single-phase direct-detection Dark Matter (DM) experiment located 2 km underground at SNOLAB in Sudbury, Canada. The detector consists of 3279 kg of LAr contained in a spherical acrylic vessel. It was specifically designed to search for direct detection of dark matter candidates known as Weakly-Interacting Massive Particles (WIMPs). Radioisotope surface activity is a major source of background in DM experiments, and most experiments use a fiducial volume to remove these events, which reduces signal acceptance.

In our analysis, instead of only relying on position reconstruction algorithms and using a strict fiducial volume to remove surface background events, we designed a new veto algorithm to have a separate tool designed specifically to identify surface events. This approach will enable us to tag and veto surface events and expand the fiducial volume to increase the signal acceptance and improve the upper limits we can set on the WIMP-nucleus cross-section.

Collaboration / Activity

DEAP-3600

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