

# Studying the presence of krypton-85 in the DarkSide detector

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Significant evidence, both astrophysical and cosmological, points to the existence of dark matter. The fundamental nature of dark matter, however, remains unknown. One appealing candidate for dark matter is the weakly interacting massive particle (WIMP). Direct detection experiments aim to observe the low energy scattering of WIMP particles off normal matter, and detectors based on noble liquid technology lead the way in WIMP sensitivity at high WIMP masses. To this day, no conclusive WIMP signals have been observed. The DarkSide experiment uses a liquid argon target in a dual-phase time projection chamber to search for WIMP dark matter. The DarkSide-50 (DS-50) experiment is located at Gran Sasso National Laboratory (LNGS) in Italy and its argon target comes from underground sources, shown to have much reduced  $^{39}\text{Ar}$  radioactivity compared to atmospheric argon. It nonetheless (and somewhat unexpectedly) contains measurable amounts of the radioactive contaminant  $^{85}\text{Kr}$ .

The work described in this talk covers the analysis of Monte Carlo simulated as well as real data from the DS-50 detector to search for a tell-tale delayed coincidence signature of  $^{85}\text{Kr}$  decays to the  $^{85}\text{mRb}$  state. The results of this search provide valuable information about the backgrounds inside of the detector as well as on its energy and spatial resolution, thus aiding in the search for WIMPs.

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