

SOURCES OF LOW-ENERGY EVENTS IN LOW-THRESHOLD DARK MATTER DETECTORS

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In recent years, searches for dark matter with sub-GeV masses have been performed by a variety of novel experiments that have reached the low-energy thresholds required for detection.

Most of these experiments have observed a large amount of background events of unknown origin, which significantly hinder their discovery reach.

In this talk, we demonstrate that a large fraction of these events are due to low energy photons created by tracks passing through detector materials via the Cherenkov process and radiative recombination. In particular, we demonstrate that these processes can explain the totality of the previously unaccountable events at SENSEI and SuperCDMS HVeV. In addition, we show that these novel backgrounds are rather universal, so they are a concern for both current and future proposed experiments employing different detection technologies. Having identified these backgrounds, we demonstrate that concrete strategies can be implemented at upcoming detectors to reduce them, enhancing in this way their discovery potential.

