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Track-induced low energy backgrounds

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In recent years, the search for dark matter with sub-GeV masses has been targeted by a variety of novel experiments that have reached the low-energy thresholds required for detection. Most of the experiments working in this unexplored kinematical regime have observed a large amount of excess events of unknown origin. In this talk, we show that Cherenkov radiation and luminescence originating from tracks passing through detector materials constitute a significant source for such events. We demonstrate that these processes can explain a large fraction of the events observed at the SENSEI, SuperCDMs HVeV and LAMPOST experiments. We also speculate on the possible implications for quantum qubit decoherence. Finally, we discuss concrete strategies that can be implemented at upcoming detectors to reduce these backgrounds.

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