

Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Identification of Electron Recoils in Gas Time Projection Chambers MAJD GHREAR, Univ of Hawaii — Directional detection of nuclear recoils is appealing because it can unambiguously demonstrate the cosmological origin of a dark matter signal and distinguish between different neutrino sources and dark matter signals. Directional recoil detection is possible using gas Time Projection Chambers (TPCs) where the ionization resulting from recoiling nuclei is imaged with high spatial granularity. A key challenge in low background detectors is the identification and rejection of background electron recoil events caused by radioactive contaminants in the materials used to construct the detector and the environment. Due to the excellent spatial resolution achieved by gas TPCs, we are able to define observables which can distinguish electron and nuclear recoils, even at keV-scale energies, based on the topology of the measured ionization. We demonstrate the electron rejection that can be achieved using different observables on simulated recoils. Furthermore, we investigate how well our observables tolerate diffusion of the ionization and how to use them simultaneously in order to maximize electron rejection. If possible, we will also present preliminary experimental results.

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Date submitted: 09 Jan 2020

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