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Electronic and nuclear recoil discrimination in xenon TPCs with the PIXeY experiment

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Liquid noble detectors are a critical piece of the international particle physics landscape, and multiple community-led processes (including the 2020 U.S. BRN for HEP Detector R&D) have identified them as one of our most promising tools for discovering new physics. In particular, the two-phase liquid/gas xenon time projection chamber is a leading technology for dark matter direct detection. A crucial part of using this technology is being able to classify energy deposits as nuclear recoils (NR) or electronic recoils (ER). This allows upcoming experiments like XENONnT and LZ to mitigate ER backgrounds like Rn daughters and pp neutrinos. I will present an analysis of ER-NR discrimination, using data from the PIXeY (Particle Identification in Xenon at Yale) experiment. PIXeY was an R&D-scale xenon TPC that operated at drift fields between 50 and 2000 V/cm. The experiment's data allows us to study discrimination across this wide range of fields, as well as its dependence on recoil energy.

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

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