

First measurement of discrimination between helium and electron recoils in liquid xenon as a means for detecting sub-GeV dark matter (HydroX)

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HydroX is a proposal to improve the sensitivity of liquid xenon TPCs to $O(1)$ GeV particle dark matter by doping a light element such as hydrogen or helium into the liquid. However, no data exist on the signal yields and discrimination for light elements recoiling in liquid xenon. This talk provides updates on the status of HydroX efforts and presents a first measurement of the discrimination between recoiling helium nuclei and electron recoils in liquid xenon. The electron and photon signals from helium nuclear recoils created using a novel, low-energy alpha particle source are simultaneously measured in a cm-scale, dual-phase xenon TPC and compared to those from electron recoils produced via Compton scattering. The excellent discrimination observed between these two populations offers significant promise for HydroX.

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