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# Experimental search for the Migdal Effect in a compact liquid xenon TPC

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The "Migdal Effect"is a predicted inelastic process in which a neutral particle scattering with a nucleus results in the excitation or ejection of a bound electron from the recoiling atom. It could enable detection of sub-threshold nuclear recoils, with the potential of dramatically expanding the sensitivity of existing detectors to low-mass dark matter and low-energy CEvNS signals. However, the effect has never been experimentally observed, and should be confirmed and characterized before potential dark matter or CEvNS signals can be discovered. In this talk, we report on a dedicated experimental campaign to search for the Migdal Effect using neutron scattering in a small liquid xenon detector at Lawrence Livermore National Laboratory. Scattered neutrons are detected by a ring of liquid scintillator detectors at fixed angle, providing a high-statistics sample of nuclear recoils. We search for events with an electronic recoil component consistent with atomic excitation from the Migdal Effect. We find no evidence for a signal consistent with predictions, and discuss possible explanations for this discrepancy. Our results, while not yet conclusive, provide important input into future experimental studies of the Migdal Effect.

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