

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

The Search for Lightly Ionizing Particles in the Large Underground Xenon Experiment¹ PAUL TERMAN², Texas A&M University, LUX COLLABORATION — The question of the nature of dark matter has become increasingly puzzling as more experiments exclude larger portions of the favored WIMP parameter space. Previous theoretical work has suggested the existence of Lightly Ionizing Particles (LIPs) with charge $e \cdot f$, where e is the electron charge and $f < 1$. We seek to utilize data from the first underground WIMP search of the Large Underground Xenon (LUX) experiment, using a dual-phase xenon Time Projection Chamber (TPC), to search for LIPs in the range $f = 0.01$ to 0.3 . To accomplish the aforementioned search new methods of Geant4 based simulation and data processing have been implemented, including the first use of pulse *chopping* for merged signals in a dual-phase TPC. Traditional event selection criteria are compared to newer Boosted Decision Tree (BDT) machine learning-based event selections to place new, world-leading limits on LIP flux.

¹DOE DE-FG02-95ER40917

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Date submitted: 07 Jan 2021

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