

The Light Dark Matter eXperiment

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The Light Dark Matter eXperiment (LDMX) proposes a high-statistics search for low-mass dark matter at a new experimental facility, Dark Sector Experiments at LCLS-II (DASEL), at SLAC. LDMX employs the missing momentum technique, where electrons scattering in a thin target can produce dark matter via “dark bremsstrahlung” that are not observed in the detector. To identify these rare signal events, LDMX individually tags incoming beam-energy electrons, unambiguously associates them with low energy, moderate transverse-momentum recoils of the incoming electron, and establishes the absence of any additional forward-recoiling charged particles or neutral hadrons. LDMX will employ low mass tracking to tag incoming beam-energy electrons with high purity and cleanly reconstruct recoils. A high-speed, granular calorimeter with MIP sensitivity is used to reject the high rate of bremsstrahlung background at trigger level while working in tandem with a hadronic calorimeter to veto rare photo nuclear reactions. Ultimately, LDMX aims to probe thermal dark matter over most of the viable sub-GeV mass range to a decisive level of sensitivity. This talk will summarize the current status of the LDMX design and performance studies and progress in developing the DASEL beamline.