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Visible Signatures of Dark Photon Decays in LDMX

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The constituents of dark matter are still unknown, and the viable possibilities span a very large mass range. Specific scenarios for the origin of dark matter sharpen the focus to within about an MeV to 100 TeV. Most of the stable constituents of known matter have masses in the lower range, and a thermal origin for dark matter works in a simple and predictive manner in this mass range as well. The Light Dark Matter eXperiment (LDMX) is a planned electron beam fixed-target experiment at SLAC that will probe a variety of dark matter models in the sub-GeV mass range using a missing momentum technique. Although optimized for this technique, LDMX is effectively a fully instrumented beam dump experiment, making it possible to search for visibly decaying signatures. This would provide another outlet for LDMX to probe complementary regions of dark matter phase space for a variety of models, provided that the additional technical challenges can be met. This contribution will give an overview of the motivations for LDMX and focus on the technical challenges of searches for visible signatures at LDMX.

Author: HOROHO, Tyler (University of Virginia)

Presenter: HOROHO, Tyler (University of Virginia)

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