PHYSICS AND ASTRONOMY
SEMINAR

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"New Electron Beam-Dump Experiments to Search for MeV to Few-GeV Dark Matter"

Abstract

In a broad class of consistent models, MeV to few-GeV dark matter interacts with ordinary matter through weakly coupled GeV-scale mediators. I will show how a suitable meter-scale (or smaller) detector situated downstream of an electron beam-dump can sensitively probe dark matter interacting via sub-GeV mediators, while B-factory searches cover the 1-5 GeV range. Combined, such experiments explore a well-motivated and otherwise inaccessible region of dark matter parameter space with sensitivity several orders of magnitude beyond existing direct detection constraints. These experiments would also probe invisibly decaying new gauge bosons ("dark photons") down to kinetic mixing of \epsilon ~ 10^{-4}, including the range of parameters relevant for explaining the (g-2)_{\mu} discrepancy. Sensitivity to other long-lived dark sector states and to new milli-charge particles would also be improved.

Thursday, September 12, 2013
3:30 p.m.
Clearihue Building
Room C113