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Electron-interacting dark matter: prospects for liquid xenon detectors and NaI detectors BENJAMIN ROBERTS, University of Queensland, VICTOR FLAMBAUM, UNSW — We investigate the possibility for the direct detection of low mass (˜GeV) WIMP dark matter in scintillation experiments. Such WIMPs are typically too light to leave appreciable nuclear recoils, but may be detected via their scattering off atomic electrons. The DAMA Collaboration has recently presented strong evidence of an annual modulation in the scintillation rate observed at energies as low as 1 keV. Despite a strong enhancement in the calculated event rate at low energies, we find electron-interacting WIMPs cannot be consistent with existing constraints. Finally, we demonstrate that the potential scintillation event rate can be much larger than may otherwise be expected, meaning that competitive searches can be performed for GeV scale WIMPs using the conventional scintillation signals. This is important given the recent and upcoming very large liquid xenon detectors. Roberts and Flambaum, Phys. Rev. D 100, 063017 (2019); Roberts, Flambaum, and Gribakin, Phys. Rev. Lett. 116, 023201 (2016); Roberts, Dzuba, Flambaum, Pospelov, and Stadnik, Phys. Rev. D 93, 115037 (2016).

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