

DAMA/LIBRA and leptonically interacting Dark Matter

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The hypothesis that DM has tree-level interactions only with leptons has been proposed as an explanation for the annually modulated scintillation signal in DAMA/LIBRA versus the absence of a signal for nuclear recoils in experiments like CDMS or XENON10. I show that even in such a leptophilic DM scenario there are loop induced DM-nucleus interactions which dominate over DM-electron scattering. In the case of pseudoscalar or axial vector coupling between DM and leptons, where the loop diagrams vanish, the explanation of the DAMA signal in terms of DM-electron scattering is strongly disfavored by the spectral shape of the signal. Furthermore, if DM can annihilate into neutrinos or tau leptons, the required cross sections are excluded by many orders of magnitude using the Super-Kamiokande bound on neutrinos from DM annihilations in the Sun.

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