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Probing MeV Dark Matter Via Solar Reflection

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Solar reflected dark matter refers to dark matter particles reflected and accelerated by the high energy electrons in solar interior. This process can boost MeV dark matter energies, enhancing potential signals in direct detection experiments. Extending this idea, we demonstrate that in detectors composed of single crystals such as silicon or germanium, the collision rate and energy deposition are influenced by the angle between the momentum of the incoming DM and the orientations of the crystallographic axes. This results in a daily modulation of the signal. On the other hand, we also explore the scenario of inelastic dark matter, where scattering within the Sun promotes dark matter to an excited state. Subsequent de-excitation in ground-based detectors releases additional energy, significantly enhancing the detection signature of dark matter with mass larger than electron mass.

Collaboration you are representing

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