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Analyzing right-handed neutrino dark matter with electron recoil events

Friday, 12 July 2024 17:00 (20 minutes)

We present theoretical estimations of the event rates for the interaction between a right-handed neutrino dark matter with an electron bound to a Xenon atom. Motivated by recent results on dark matter in cosmological and astrophysical contexts, we study a fermionic dark matter candidate with a mass of 200 keV as a case of example. The interaction occurs through an effective electromagnetic model where the output is standard-model particles. This mechanism allows right-handed neutrinos to couple with standard-model particles with the interchange of W or Z bosons. Based on a previous result and with the aim of improving it, we incorporate the ionization form factor that arises from the interaction of the fermionic candidate with a bound electron. In addition, we compute the sensitivity curves for different direct detection experiments that could potentially detect such phenomena. Our numerical framework is extensible to other dark matter particle masses in the sub-MeV range and for other materials.

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