

Dark matter models with uniquely spin-dependent detection

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It is often assumed that the first evidence for direct dark matter detection will come from experiments probing spin-independent interactions, because of higher sensitivities due to coherence effects. We explore the possibility of models that would be invisible in such experiments, but detectable via spin-dependent interactions. The existence of much larger (or only) spin-dependent tree-level interactions is not sufficient, due to potential spin-independent subdominant or loop-induced interactions. We find that most models with detectable spin-dependent interactions would also generate detectable spin-independent interactions. Models in which a light pseudoscalar acts as the mediator seem to uniquely evade this conclusion. We present a viable dark matter model generating such an interaction.

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