

Axial DM with a new $SU(2)$ symmetry

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In this work, we propose an extension to the Standard Model (SM) by adding a new $SU(2)$ gauge symmetry, which is spontaneously broken by an extended scalar sector. Under this new symmetry, the left-handed fields of the SM remain invariant, while the right-handed ones form a doublet together with a new, heavier partner. In addition, a new fermionic field S_R is introduced, which transforms nontrivially under this symmetry and provides an axial dark matter (DM) candidate whose direct detection depends on the spin of the fields involved. Along with the DM candidate, we show that this model can also generate mass terms for the SM neutrinos through dimension-5 operators.

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