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SIMP model at NNLO in chiral perturbation theory

Content :

We investigate the phenomenological viability of a recently proposed class of composite dark matter models where the relic density is determined by $3 \rightarrow 2$ number-changing processes in the dark sector. Here the pions of the strongly interacting field theory constitute the dark matter particles. By performing a consistent next-to-leading- and next-to-next-to-leading-order chiral perturbative investigation we demonstrate that the leading-order analysis cannot be used to draw conclusions about the viability of the model. We further show that higher-order corrections substantially increase the tension with phenomenological constraints challenging the viability of the simplest realization of the strongly interacting massive particle paradigm.

Summary :

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