

Loop corrections to dark matter direct detection in a pseudoscalar mediator dark matter model

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If dark matter (DM) is a fermion and its interactions with the standard model particles are mediated by pseudoscalar particles, the tree-level amplitude for the DM-nucleon elastic scattering is suppressed by the momentum transfer in the non-relativistic limit. At the loop level, on the other hand, the spin-independent contribution to the cross section appears without such suppression. Thus, the loop corrections are essential to discuss the sensitivities of the direct detection experiments for the model prediction. The one-loop corrections were investigated in the previous works. However, the two-loop diagrams give the leading order contribution to the DM-gluon effective operator and have not been correctly evaluated yet. Moreover, some interaction terms which affect the scattering cross section were overlooked. In this talk, we show the cross section obtained by the improved analysis and discuss the region where the cross section becomes large.

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