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

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In fermionic dark matter (DM) models with pseudoscalar mediators, the tree-level amplitude for the DM-nucleon elastic scattering is suppressed by the momentum transfer in the non-relativistic limit. However, it is not suppressed at the loop level, and thus the loop corrections are essential to discuss the sensitivities of the direct detection experiments for the model prediction. In particular, two-loop diagrams give a leading order contribution for an operator with gluon fields but were not correctly evaluated. 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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