

Phenomenology 2021 Symposium



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Superfluid EFT for sub-GeV dark matter detection

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The detection of low mass dark matter is under development with the advancement of experiment techniques. The superfluid helium-4 detector covers an extensive detection range from DM mass keV to GeV among the setups. I will present a complete theoretical framework for all processes within the superfluid to fill in the missing theory for sub-GeV DM detection. First, we use effective field theories to construct the interaction Lagrangian between quasi-particles. Second, we use a U(1) gauge spontaneous breaking and current element method to derive the interaction between test particles and quasi-particles. In the end, I will discuss relevant cross-sections and decay rates.

Summary

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