

Self-consistent Calculation of the Sommerfeld Enhancement

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The Sommerfeld enhancement is an important effect to modify the dark matter annihilation cross section if the dark matter couples with a force mediator whose mass is much smaller than the dark matter mass. Usually, the cross section is estimated as a product of the leading order cross section and the enhancement factor, which is calculated by solving Schrodinger equation with long range potential. However, this calculation is not guaranteed to satisfy partial wave unitarity upperbound. In this talk, I will discuss the dark matter s-wave annihilation in non-relativistic regime. In our calculation, the annihilation effect is consistently included in the Schrodinger equation. Our procedure gives a cross section formula which satisfy the partial wave unitarity bound.

Summary

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