

Quantum theory of dark matter scattering

Thursday, 15 June 2023 14:00 (20 minutes)

A long-range force between dark matter particles makes significant impacts on dark phenomenology. It enhances the annihilation cross section at the late Universe (Sommerfeld enhancement), which affects the prospects for detecting annihilation products (indirect detection experiments). It also leads to a large self-scattering cross section, which forms a significant core in dark matter halos. These two effects exhibit an interesting correlation: for example, when the Sommerfeld enhancement factor is significantly large for a certain value of the parameter (resonance), the self-scattering cross section is also resonantly enhanced. In this talk, we first review how the Sommerfeld enhancement factor and self-scattering cross section are computed by using a scattering state in quantum mechanics. Then, we formulate the relation between these two effects and discuss how the correlated resonance is understood in our formulation.

Secondary category for the parallel session (optional)

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