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DRAKE: Dark matter Relic Abundance beyond Kinetic Equilibrium

Wednesday 28 July 2021 09:30 (20 minutes)

In the usual approach to the determination of the dark matter thermal relic abundance an assumption of local thermal equilibrium is made. In this talk I will discuss how to go beyond this assumption and introduce DRAKE —a numerical precision tool that can trace not only the DM relic density, but also its velocity dispersion and full phase space distribution function. I will review the general motivation for this approach and, for illustration, highlight three concrete classes of models where kinetic and chemical decoupling are intertwined in a way that can impact the value of the relic density by as much as an order of magnitude: i) dark matter annihilation via a narrow resonance, ii) Sommerfeld-enhanced annihilation and iii) 'forbidden' annihilation to final states that are kinematically inaccessible at threshold.

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Collaboration / Activity

Theory

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