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New Thermal Decoupling Windows to the Dark Sector

Wednesday 14 January 2026 12:30 (1 hour)

Increasingly strong experimental constraints on new physics at the electroweak scale motivate us to explore new possibilities for dark matter (DM) beyond the thermal weakly-interacting massive particle (WIMP) paradigm. One important strategy to excavate the experimentally viable space of new possibilities for DM is to abandon the assumption of thermal equilibrium between the dark and Standard Model (SM) sectors, and consider the multitude of DM production scenarios in which the dark sector can thermally decouple from the SM prior to DM freezeout. Thermally decoupling DM production is equally as predictive as the thermal WIMP scenario, producing sharp experimental targets, and in many cases, as I will show, completely altering existing experimental constraints which neglect thermally decoupling effects. I will present new results for thermally decoupling freezeout production of DM in a few benchmark models, providing new experimental targets for DM searches below the electroweak scale.

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