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Dynamical Dark Matter from Strongly-Coupled Dark Sectors[1]
FEI HUANG, KEITH DIENES, SHUFANG SU, Univ of Arizona, BROOKS THOMAS, Colorado College — Dynamical Dark Matter (DDM) is a new frame work for dark-matter physics that relies on a balancing between decay widths and abundances across a vast ensemble of particle species which collectively constitute the dark-matter candidate. Such a balancing can be achieved in broad variety of ways; however, only a small number of these possibilities have thus far been explored in the literature. Indeed, previous studies have focused on a particular class of DDM ensembles–motivated primarily by Kaluza-Klein towers in theories with extra dimensions–for which the density of states behaves roughly as a polynomial of the mass of the state. By contrast, in this paper, we study the properties of a different class of DDM ensembles for which the density of states grows exponentially with the mass of the state. The canonical example of such an ensemble is a collection of ?hadronic? resonances associated with the confining phase of a strongly-coupled dark sector. We demonstrate how an appropriate balancing between decay widths and abundances can naturally arise for such ensembles, despite this exponential rise in the density of states, and investigate how their properties are constrained by observational data.

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