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Dynamical Dark Matter from Strongly-Coupled Dark Sectors

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In the Dynamical Dark Matter (DDM) framework, the dark sector comprises a vast ensemble of particle species whose Standard-Model decay widths are balanced against their cosmological abundances. In this talk, we present a new class of DDM ensembles in which the masses of the dark states lie along linear Regge trajectories and the density of dark states grows exponentially with mass. Ensembles with these properties arise naturally as the “hadronic” resonances associated with the confining phase of a strongly-coupled dark sector; they also arise naturally as the gauge-neutral bulk states of Type I string theories. We study the dynamical properties of such ensembles and map out their corresponding viable parameter spaces. We find that viable DDM ensembles of this sort exist with fundamental energy scales ranging from the GeV scale all the way to the Planck scale, but that many internal aspects of these theories exhibit surprising, non-trivial correlations.

Summary

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