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Dynamical Dark Matter: A New Framework for Dark-Matter Physics

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Abstract:

Dynamical dark matter (DDM) is a new framework for dark-matter physics in which the requirement of stability is replaced by a delicate balancing between lifetimes and cosmological abundances across a vast ensemble of individual dark-matter components whose collective behavior transcends that normally associated with traditional dark-matter candidates. This absence of stability implies that quantities such as the total dark-matter relic abundance and the dark-matter equation-of-state parameter experience non-trivial time-dependences beyond those associated with the expansion of the universe. In this talk, I provide an overview of the DDM framework and provide examples of theoretical contexts in which DDM ensembles naturally arise. I also discuss the potential implications of DDM scenarios for collider phenomenology, dark-matter direct detection, and cosmology and discuss how such scenarios can be differentiated from traditional dark-matter models.

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