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The evolution of cosmic structure with coupled dark matter and dark energy PAUL SUTTER, PAUL RICKER, Univ of Illinois - Urbana — We examine how coupled dark matter and dark energy modify the development of structure in the universe. Specifically, we study how the various effects of these theories, such as a fifth force in the dark sector and a modified particle Hubble drag, produce variations in the redshifts of caustic formation and the present-day density profiles of Zel'dovich pancakes. We compare our results in direct simulation to a perturbation theory approach for the dark energy scalar field. We also examine whether models that have been tuned to match the constraints of current observations can produce new observable effects in the nonlinear structure of pancakes. Our results suggest that a fully realistic three-dimensional simulation will produce significant new observable features, such as modifications to the mass function and halo radial density profile shapes, that can be used to distinguish these models from standard concordance cosmology and from each other.

Paul Sutter
Univ of Illinois - Urbana

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