

JOINT TUFTS/MIT COSMOLOGY SEMINAR

Kinetic recoupling of dark matter

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The matter power spectrum on small scales offers a powerful probe of dark sector physics. Even if dark matter has no non-gravitational portal to the Standard Model, power spectral features can point to interactions within the dark sector, or constrain the conditions of dark matter production. In particular, a delayed kinetic decoupling of dark matter from the radiation bath is known to produce a cutoff in the power spectrum, erasing structure on small scales. We study the possibility that dark matter decouples ordinarily, but re-enters kinetic equilibrium later on, which may take place if the interaction rate is enhanced at late times. Such a "kinetic recoupling" imprints unique features on the matter power spectrum that are qualitatively distinct from the cutoffs associated with other new physics scenarios. We investigate the signatures of an epoch of kinetic recoupling, and explore how such features can be traced to dark sector microphysics.

Tuesday, December 13, 2022, 2:30 pm
Cosman Seminar Room
Center for Theoretical Physics
Building 6C, Room 6C-442
Massachusetts Institute of Technology