

JOINT TUFTS/MIT COSMOLOGY SEMINAR

Neutrino-Assisted Early Dark Energy: Theory and Cosmology

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The tension between measurements of the Hubble constant obtained at different redshifts may provide a hint of new physics active in the relatively early universe, around the epoch of matter- radiation equality. A leading paradigm to resolve the tension is a period of early dark energy, in which a scalar field contributes a subdominant part of the energy budget of the universe at this time. This scenario faces significant fine-tuning problems which can be ameliorated by a non- trivial coupling of the scalar to the standard model neutrinos. These become non-relativistic close to the time of matter-radiation equality, resulting in an energy injection into the scalar that kick- starts the early dark energy phase, explaining its coincidence with this seemingly unrelated epoch. We present a minimal version of this neutrino-assisted early dark energy model, and perform a detailed analysis of its predictions and theoretical constraints. We consider both particle physics constraints – that the model constitute a well-behaved effective field theory for which the quantum corrections are under control, so that the relevant predictions are within its regime of validity – and the constraints provided by requiring a consistent cosmological evolution from early through to late times. Our work paves the way for testing this scenario using cosmological data sets.

Tuesday, October 4, 2022, 2:30 pm

Zoom link will be distributed to joint cosmology seminar mailing list. See <https://cosmos.phy.tufts.edu/mailman/listinfo/cosmology-seminar> to join.

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