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# COZMIC: Cosmological Zoom-in Simulations with Initial Conditions Beyond CDM

*Tuesday 25 March 2025 09:00 (15 minutes)*

I will present COZMIC, a suite of over 100 cosmological zoom-in simulations with initial conditions beyond CDM. COZMIC spans initial conditions for warm, fuzzy, and interacting dark matter models. The shape of the linear matter power spectrum, P(k), is imprinted on the corresponding subhalo populations. Modeling this effect improves fuzzy and interacting dark matter bounds from the Milky Way satellite population by orders of magnitude. Simulations with a fractional non-CDM component also suppress subhalo abundances, yielding new limits on mixed cold/warm dark matter models. Finally, combining P(k) suppression with strong, velocity-dependent DM self-interactions alters core collapse, revealing an interplay between early and late-universe DM physics.

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