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A Reconstruction Conjecture: Deciphering the Structure of the Dark Sector from the Matter Power Spectrum

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Non-trivial dynamics within the dark sector can give rise to a complicated, non-thermal dark-matter phase-space distribution, which in turn can affect the shape of the matter power spectrum. In this talk, we examine the extent to which one can address the archaeological “inverse” problem of deciphering the properties of the underlying dark sector from features imprinted in the matter power spectrum. We also posit a simple relation that allows us to reconstruct the salient features of the underlying dark-matter phase-space distribution directly from the matter power spectrum. This conjecture therefore provides a way of gleaning additional information about the particle properties of the dark sector through purely gravitational means.

Summary

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