Contribution ID: **1274**   Type: **DM**

Extracting Dark-Matter Velocities from Halo Masses: A Reconstruction Conjecture

Tuesday 25 May 2021 17:45 (15 minutes)

The distribution of primordial dark-matter velocities can significantly influence the growth of cosmological structure. In principle, one can therefore exploit the halo-mass distribution in order to learn about the dark sector. In practice, however, this task is both theoretically and computationally intractable. In this talk, we present a simple one-line conjecture which can be used to "reconstruct" the primordial dark-matter velocity distribution directly from the shape of the halo-mass function. Although our conjecture is completely heuristic, we show that it successfully reproduces the salient features of the underlying dark-matter velocity distribution — even for non-trivial distributions which are highly non-thermal and/or multi-modal, such as might occur for non-minimal dark sectors. Our conjecture therefore provides an operational tool for probing the dark sector which does not rely on the existence of non-gravitational couplings between dark and visible states.

Summary

Primary author: MANOGUE, Kevin (Lafayette College)

Co-authors: THOMAS, Brooks (Lafayette College);   DIENES, Keith (University of Arizona);   HUANG, Fei (ITP CAS and UC Irvine);   KOST, Jeff (University of Sussex)

Presenter: MANOGUE, Kevin (Lafayette College)

Session Classification: DM IV