Contribution ID: **66** Type: **Talk**

High-z Cosmic Web Statistics in Fuzzy Dark Matter Cosmologies

Monday 8 August 2022 16:34 (3 minutes)

The vanilla Lambda cold dark matter (ΛCDM) model has been so successful that 2018 constraints from the Planck collaboration are based on the variation of the same 6 cosmological parameters as the analysis of the BOOMERanG 1998 data. Yet, the lack of evidence for any constituent particle and various small-scale challenges of the vanilla Lambda cold dark matter (ΛCDM) have generated considerable interest in alternative dark matter scenarios such as fuzzy dark matter (FDM). Cosmological hydrodynamical simulations of high-redshift galaxy and halo formation can help investigate tell-tale signs of FDM, which in turn inform observational searches. In this talk, I will start by discussing how FDM's de Broglie scale-associated power spectrum cutoff modifies dark matter halo density and shape profiles. They reflect the broken hierarchy of structure formation which may have observable consequences. As a third Cosmic Web statistic, we will look at intrinsic alignment correlations of halos as predicted by the linear alignment model and will find statistically significant trends with the axion particle mass m. We cover masses in the range $m = 10^{-22} - 2 \times 10^{-21}$ eV and focus on the high-redshift Cosmic Web in which dark matter signatures are more pristine than in today' s Universe.

Primary authors: DOME, Tibor (Institute of Astronomy, University of Cambridge); Dr FIALKOV, Anastasia (Institute of Astronomy, Cambridge University)

Co-authors: Prof. SCHÄFER, Björn Malte (Heidelberg University); Dr MOCZ, Philip (Lawrence Livermore National Laboratory)

Presenter: DOME, Tibor (Institute of Astronomy, University of Cambridge)

Session Classification: Poster Lightning Talks