Contribution ID: **9** Type: **not specified**

Randomness, Warmth and Spin in Wave Dark Matter

Tuesday, September 30, 2025 3:15 PM (45 minutes)

I will describe how post inflationary production mechanisms (and even some inflationary ones) of ultralight dark fields, naturally lead to a free-streaming/Jeans suppression as well as a Poisson fluctuation related enhancement in the matter power spectrum. The lack of observation of these features can provide relatively model independent bound on the mass of dark matter particles. In general there is scale dependent growth of the power spectrum which can lead to suppressions on some scales and also enhanced early structure formation, including ubiquitous soliton formation on other scales. When such signatures are detected/constrained observationally, they provide insights into the production mechanisms as well as the mass and spin of such dark matter fields. Time permitting, I will discuss a general analytic framework for calculating the growth of structure in single and multi-species wave or particle dark matter with arbitrary density fractions and initial phase space distributions/field spectra, and their comparisons with N-body and Schrödinger Poisson simulations.

Presenter: AMIN, Mustafa (Rice University)