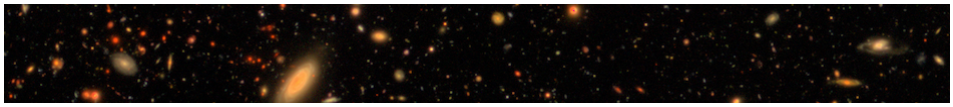

Contribution ID: **26** Type: **not specified**

Stochastic Properties of Ultralight Scalar Fields

Wednesday, 29 March 2023 09:00 (40 minutes)

Ultralight axionlike particles are well-motivated dark matter candidates that are the target of numerous direct detection efforts. In the vicinity of the Solar System, such particles can be treated as oscillating scalar fields. The velocity dispersion of the Milky Way determines a coherence time of about
10
6
oscillations, beyond which the amplitude of the axion field fluctuates stochastically. Any analysis of data from an axion direct detection experiment must carefully account for this stochastic behavior to properly interpret the results. This is especially true for experiments sensitive to the gradient of the axion field that are unable to collect data for many coherence times. Indeed, the direction, in addition to the amplitude, of the axion field gradient fluctuates stochastically. I will present a stochastic treatment for the gradient of the axion field, which can be applied to any axion signal, regardless of coherence time. Additionally, I will show that ignoring the stochastic behavior of the gradient of the axion field can potentially result in failure to discover a true axion signal.

Presenter: LISANTI, Mariangela

Session Classification: Morning session-1