Contribution ID: **29** Type: **not specified**

Dark Matter Misalignment Through the Higgs Portal

Thursday, May 18, 2023 12:05 PM (25 minutes)

A light singlet scalar field feebly coupled through the super-renormalizable Higgs portal provides a minimal and well-motivated realization of ultra-light bosonic dark matter. We study the cosmological production of dark matter in this model by elucidating the dynamics of two sources of scalar field misalignment generated during the radiation era. For relatively large masses, dark matter is produced through thermal misalignment, by which the scalar field is driven towards large field values as a result of the finite-temperature effective potential. The dominance of thermal misalignment in this mass range leads to a sharp relic abundance prediction which is, to a significant extent, insensitive to the initial conditions of the scalar field. On the other hand, for low mass scalars, dark matter is produced via VEV misalignment, which is caused by the induced scalar field vacuum expectation value triggered by the electroweak phase transition. We show that the relic abundance in this low mass range is sensitive to the scalar field initial conditions. We compare the relic abundance predictions with constraints and projections from various experimental and observational tests.

Primary author: BATELL, Brian Thomas

Presenter: BATELL, Brian Thomas

Session Classification: Dark matter