Contribution ID: **208** Type: **not specified**

Constraints on Scalar Dark Matter Production from the Inflaton

Monday, May 8, 2023 4:45 PM (15 minutes)

In this talk, I discuss the production of a spectator scalar dark matter field that directly couples to the inflaton. Two specific inflationary potentials, the Starobinsky and T-model of inflation, are considered, which satisfy the constraints on the scalar tilt (n_s) and tensor-to-scalar ratio (r) as measured by the Planck satellite. Excitation of the light scalar dark matter during inflation can lead to significant isocurvature perturbations. However, they can be avoided by inducing a sizable effective dark matter mass during the inflationary phase. For purely gravitational production, the Planck isocurvature constraints require that the dark matter mass must be greater than the Hubble scale at the horizon exit, with m_{chi} > H_*. It is argued that these constraints can be extended to a broad range of single-field slow-roll inflation models. Additionally, isocurvature, dark matter abundance, and Lyman-α constraints on the direct coupling and bare dark matter mass are derived. Finally, I briefly discuss the models with non-minimal coupling.

Primary author: VERNER, Sarunas (University of Florida)

Presenter: VERNER, Sarunas (University of Florida)

Session Classification: Cosmology II