



Physics Colloquium



Tuesday, October 29, 2019, 3:30PM in SC 10

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A Gap in our Cosmic History: Nonlinear Dynamics after Inflation

Quantum fluctuations, together with a period of accelerated expansion (inflation) in the very early universe likely provided the seeds for the temperature anisotropies seen in the cosmic microwave background. These temperature anisotropies provide an insight into this period of accelerated expansion in the very early universe. From later in our cosmic history, we also have observational constraints on the happenings in our universe after the first light nuclei formed.

However, the period between the end of inflation and the production of light nuclei is, so far, largely unconstrained. This fascinating period might include highly nonlinear dynamics at the end of inflation, explosive production of particles and phase transitions, potentially responsible for generation matter-antimatter asymmetry, production of dark matter etc. After an overview of this gap in our cosmic history, I will focus on how inflation ends; in particular I will provide novel results on the formation and dynamics of solitons (oscillons) at the end of inflation. I will discuss their potential implications on the expansion history, primordial black hole formation and generation of gravitational waves. I will also present general results regarding the equation-of-state of the universe at the end of inflation.

Refreshments at 3:00PM in SC 103