JOINT TUFTS/MIT COSMOLOGY SEMINAR

Multiversal Axions

Matt Kleban
NYU

I will describe a novel technique that renders theories of N axion fields analytically and numerically tractable. The number of local minima of the potential scales exponentially with N, making large N theories extremely complex "landscapes" for which a brute-force analysis is impossible. For $N \sim 100$ and with Planckian or GUT/string energy scales one generically finds values of the vacuum energy consistent with the observed dark energy. These minima are metastable and long-lived, and decay via thin-wall Coleman de Luccia transitions to $\sim N$ neighbors. This landscape supports a variety of types of slow-roll inflation, and tunneling is generically followed by at least some inflation. It also naturally contains one or more light fields that can solve the strong CP problem and serve as (fuzzy) dark matter. Hence, a model with only GUT-scale random parameters and ~ 100 fields with random couplings can account for the big bang (tunneling), inflation, dark matter, and dark energy.

Tuesday, October 3, 2017, 2:30 pm
574 Boston Ave, Room 316
Tufts University

Refreshments at 2:00 outside room 304