JOINT TUFTS/MIT COSMOLOGY SEMINAR

Particle Production from Cosmic Strings

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How can we determine if the universe is permeated by a network of cosmic strings, and what would it teach us about physics beyond the Standard Model? If the symmetry breaking scale is high (say GUT scale), then the strings are sufficiently massive that they should have been detected through lensing of the cosmic microwave background. Lighter strings cannot be exposed by gravitational probes, but instead we may seek evidence of the string network through its particle emission. Direct evidence may come in the form of a diffuse cosmic ray flux or spectral distortion of the CMB, while indirect constraints are provided by nucleosynthesis. I will discuss non-superconducting cosmic strings in a generic "hidden sector" extension of the Standard Model, which has often been studied in the context of dark matter, collider phenomenology, and electroweak baryogenesis. The Standard Model fields couple to the cosmic string, leading to particle production. I will discuss recent improvements and extensions of the analytic, perturbative particle production calculation, and I will survey various cosmological and astrophysical signatures in order to assess the extent to which light cosmic strings can be tested.

Tuesday, February 3, 2015, 2:30 pm
Robinson Hall, Room 250
Tufts University

Refreshments at 2:00 in Knipp Library, Room 251