JOINT TUFTS/MIT COSMOLOGY SEMINAR

Observables from a Complex Early Universe

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Can we tell if the very early universe was simple or complex? What if the early universe was complex – with many fields interacting non-adiabatically with the inflaton during and after inflation? How can we calculate observables if we only have some coarse grained information about the microphysics of such systems? I will present a calculational framework and some general results regarding repeated, non-adiabatic and stochastic particle production in spectator fields, and the resulting curvature perturbations. I will discuss observational implications in the form of nontrivial features, and scale dependence in the curvature power spectrum. The calculational framework is motivated by the phenomenon of current conduction in disordered wires (Anderson Localization), where relatively universal results are obtained independent of the details of the microphysics. The tallk will be mostly based on arXiv:2001.09158, 1902.09598, 1706.02319 and 1512.0263
At the end of the talk, if time permits and there is interest, I might also highlight some new results about (i) oscillons, and (ii) early dark energy [mostly unrelated to the main part of the talk].

Tuesday, May 12, 2020, 2:30 pm
online
Massachusetts Institute of Technology