Emergent Cosmology from Matrix Theory

Robert Brandenberger
McGill University

The BFSS (Banks, Fischler, Shenker and Susskind) matrix model is a proposed non-perturbative definition of superstring theory. It is a quantum mechanical model of nine $N \times N$ Hermitean matrices (no background space). Recent work has shown that in the large $N$ limit, a continuous space with three large and six small dimensions emerges. We show that thermal fluctuations in a high temperature state of this model yield scale-invariant spectra of cosmological perturbations and gravitational waves. Thus, the BFSS matrix model may yield both emergent space and an emergent early universe phase.

Tuesday, February 15, 2022, 2:30 pm

Zoom link will be distributed to joint cosmology seminar mailing list. See https://cosmos.phy.tufts.edu/mailman/listinfo/cosmology-seminar to join.

Tufts University