Theory Seminar

Thursday, December 3, 2009 2:00 PM 831 Pupin Hall

EXTRA DIMENSIONS, LANDSCAPES OF VACUA, AND RUNAWAY DOMAIN WALLS

Theories that invoke extra dimensions, such as string theory, typically give rise to many lower-dimensional vacuum states. For positive energy metastable minima, the cosmological implications of this picture are dramatic, leading to an eternally inflating universe which can seed many different vacuum phases through the nucleation of vacuum bubbles. In this talk, I will describe how domain walls separating four-dimensional vacua can influence the stability of the overall volume modulus of a compactification, leading to spacetime solutions containing either a timelike singularity or a region where space decompactifies, depending on the metric ansatz. Such solutions can arise in compactifications of Einstein--Maxwell theory and Type IIB string theory. The existence of an instability towards decompactification has important implications for the formation of networks of topological defects and the population of vacua during eternal inflation.

Matthew Johnson, Caltech