ICTS String Seminar

Title : Euclidean wormholes, baby universes, and unitarity in quantum gravity

Speaker : Vijay Balasubramanian (University of Pennsylvania)

Date : Wednesday, 09 September 2020

Time : 06:30 pm (IST)

Abstract : Spacetime wormholes in the Euclidean path integral for gravity represent the nucleation and annihilation of baby universes. In the first part of the seminar I show how their inclusion in the replica method preserves monogamy of entanglement and semiclassical unitarity. I apply the results to universes that have a positive cosmological constant. In the second part of the talk I extend a recently introduced topological model of gravity with baby universes to include a sum over spin structures. The results suggest that the gravitational path integral with wormholes should be interpreted in terms of an ensemble of dual theories. I conclude by discussing the apparent tension between these effects of spacetime wormholes, namely, the restoration of unitarity in manifestations of quantum entanglement in semiclassical gravity vs. the apparent need to describe gravitating systems in terms of a statistical ensemble.

ICTS virtual seminar : Please register at https://docs.google.com/forms/d/e/1FAIpQLSf0jLgoqiOgDnxbEBGiuIWiOmh9WX8caH-pr13qDBZOO91lmg/viewform

(Links to join the seminars will be sent to your registered email address)

Recordings of past talks can be found here:
https://www.youtube.com/channel/UCw9LdPQ5t7Q7muD0qzn70TA