ICTS PhD Synopsis Seminar

Title : Aspects of open quantum field theories

Speaker : Chandan Kumar Jana, ICTS-TIFR, Bangalore

Date : Monday, July 27, 2020

Time : 10:00 AM

Venue : Online seminar (Please use this link to join the seminar - https://guest.lifesize.com/1126104 Google chrome is preferred)

Abstract : Open quantum systems have been studied quite extensively since its advent. However, a transition to open field theories, in particular, relativistic open field theories, is mostly underexplored. Despite several attempts, a model for interacting relativistic open field theory was absent in the literature. A model for relativistic open fields can be implemented in the study of a relativistic heavy-ion collision, plasma physics, cosmology, etc. More fundamentally, one can try to understand decoherence in field theory.

In this seminar, I shall describe the challenges in the study of relativistic open systems. First, we shall consider toy models consisting of scalar and Fermion fields and study one loop renormalizability of these field theories. We show that one loop integrals in open field theory are non-local divergent. A cure to this problem is absent to date. In the second part of the seminar, I shall show that one can construct an interacting open effective action for a probe scalar field using holography. The effective action points to a generalisation of the linear fluctuation-dissipation relation to a set of non-linear fluctuation-dissipation relations.