ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS PhD Seminar

Title : Quantum aspects of black holes: The bags of gold and monogamy paradoxes

Speaker : Joydeep Chakravarty (ICTS-TIFR, Bangalore)

Date : Monday, 12th September 2022

Time : 11:00 am (IST)

Abstract : In this talk, we address some puzzles about the black hole interior from the bulk perspective. In the first part, we discuss how black holes in AdS can host an enormous number of semiclassical excitations in their interior, which is seemingly not reflected in the Bekenstein Hawking entropy. In addition to the paradox in the entropy, we argue that the treatment of such excitations using effective field theory also violates black holes' expected spectral properties. We propose that these mysteries are resolved because apparently orthogonal semiclassical bulk excitations have small inner products between them; and consequently, a vast number of semiclassical excitations can be constructed using the Hilbert space which describes black hole's interior. Further we verify our resolution using consistency checks using the dual CFT. In the second part, we discuss a toy model in empty flat space which captures the essential features of the monogamy paradox for old flat space black holes within a clean calculational framework. The chief non-trivialities here are a consequence of flat space gravity having a unique vacuum and infrared structure, say in contrast to AdS. We formulate the paradox in terms of monogamy of CHSH correlations, which we use to quantify the monogamy of entanglement, and use it to write a sharp statement of the violation of the monogamy of entanglement. We argue that the resolution of the paradox is that the Gauss constraint is not properly taken into account while posing the monogamy paradox.

Venue : Online & Madhava Lecture Hall (ICTS)
Zoom link: https://icts-res-in.zoom.us/j/88392184890?pwd=d2t4WGxScDJ3a0VCSDNka0lObVkwUT09
Meeting ID: 883 9218 4890
Passcode: 121222