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ICTS Thesis Defense Seminar

Title : Holography, Cosmology and Tachyons

Speaker : Ashik H (ICTS-TIFR, Bengaluru)

Date : Friday, 18 September 2026

Time : 9:45 AM – 11:15 AM (IST)

Abstract : In this talk, I will briefly summarise the works I have done during my PhD. The main idea I would like to convey is the unusual localisation of information in quantum theories of gravity.

I'll start with the simple example of a ball of finite radius in asymptotically flat space-time and explain, using gravitational Gauss' law, that information is holographic in nature even for finite regions. The result is established for an interesting class of states which, in a usual QFT, could store information in a localised manner such that outside observers cannot access it by local measurements. This work (arXiv:2410.17316) was done in collaboration with Nava Gaddam.

Then I'll explain the implications of gravitational constraints in de Sitter space time. Here the cauchy slices are compact, which considerably constrains the set of all allowed states and operators. We will see that lower-point correlators computed on simple states look different than the vacuum correlators, and one has to introduce a heavy observer state to get vacuum correlations like in a de Sitter QFT. This work (arXiv:2507.15926) was done in collaboration with Suvrat Raju and Tuneer Chakraborty.

Finally, I will explain one possible way of quantising the tachyon effective action by adding quantum corrections to it in a systematic manner using collective field theory methods. The resulting theory has states that are of the form of a Coherent state background and excitations on top of it. I'll also discuss possible implications of this result. This work (arXiv:2604.18679) was done in collaboration with Athira P V and Priyadarshi Paul.

Venue : Chern Lecture Hall

Zoom: <https://icts-res-in.zoom.us/j/93344357475?pwd=B0hun8rlmaMv9GnL8YxyIXTi5EmvO6.1>

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