



ICTS String Seminar

Title : ETH-monotonicity and the black hole singularity

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Date : Wednesday, 18 March 2026

Time : 3:30 PM (IST)

Abstract : ETH-monotonicity is a property of quantum chaotic many-body systems which reinforces the Kelvin statement of the second law of thermodynamics over and above the universal entropic contribution. We show that higher-dimensional holographic conformal field theories possess ETH-monotonicity. Smaller black hole microstates have stronger contribution from ETH-monotonicity to the second law of thermodynamics. ETH-monotonicity also dominates quantum fluctuations in small black hole microstates in higher dimensions. We find that the relative extra gain in energy measures the curvature at the black hole horizon of small black holes. In the smallest size limit, the black hole curvature singularity is constructed with microstates for which ETH-monotonicity starts competing with the entropic factor. We expect that ETH-monotonicity will persist even in the ultimate quantum theory of gravity. Because it is a property of many-body quantum chaotic systems which becomes more prominent with decreasing system size, unlike other physical properties which are usually more predictable with increasing system size. Two-dimensional holographic conformal field theory does not possess all features of ETH-monotonicity which is in agreement with the absence of curvature singularity in the BTZ black hole.

Venue : Online

Zoom Link: <https://icts-res-in.zoom.us/j/88092766911?pwd=R3ZrVk9yeW96ZmQ4ZG9KRzVhenRKZz09>

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