



ICTS Colloquium

Title : The entropy of Hawking radiation

Speaker : Raghu Mahajan (Stanford University)

Date : Tuesday, 20 December 2022

Time : 11:30 am (IST)

Abstract : In 1974, Stephen Hawking discovered that black holes emit blackbody radiation and that this causes them to slowly shrink in size and eventually disappear. This effect is a natural outcome of studying small quantum fluctuations near the horizon of a black hole. Hawking's calculation implies that the final radiation that remains after the black hole disappears is completely noisy and contains no information about the star that underwent gravitational collapse to form the black hole. This is deeply puzzling and violates a core principle of fundamental physics, that the time-evolution of physical systems should be reversible in time.

As a mathematical diagnostic of this violation, researchers study the entropy of Hawking radiation as a function of time. In this colloquium talk, I will describe some recent results about the discovery of nontrivial saddle points in the gravity path integral, which when taken into account in the calculation, modify the entropy of Hawking radiation in a fundamental way and make it consistent with information-preserving dynamics. This result is a semiclassical demonstration of the long-held belief that the process of black-hole evaporation is information-preserving.

Venue : Hybrid Mode

Offline: Madhava Lecture Hall

Online: Please click on the below link to join the meeting

<https://icts-res-in.zoom.us/j/82481959079?pwd=ZkYybkdVdQXlMVHE4TUx5eXptZFNvdz09>

Meeting ID: 824 8195 9079

Passcode: 202021