



ICTS

INTERNATIONAL
CENTRE *for*
THEORETICAL
SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Seminar

Title : Echo Mapping Black Holes with Light

Speaker : Prashant Kocherlakota (Black Hole Initiative, Harvard University, USA)

Date : Monday, 30 June 2025

Time : 3:30 PM (IST)

Abstract : Future generations of the Event Horizon Telescope are expected to deliver sharper, higher-contrast, and multi-wavelength movies of M87* and Sgr A*. In this talk, we will explore how such observations could enable the detection of photon rings—and what these features can reveal about the fundamental nature of black holes. When turbulent plasma near the event horizon flares, some of the emitted light travels along longer, highly curved paths through spacetime, resulting in delayed “echoes.” These echoes appear concentrated in a narrow, bright structure on the observer’s screen known as the photon ring. Successive echoes arrive later and are progressively demagnified, imprinting a striking self-similar pattern. In the near future, by measuring key parameters such as the echo delay time and the demagnification exponent, we will gain access to novel, observational tests of the geometry of astrophysical black hole spacetimes.

Venue : Emmy Noether Seminar Room

Zoom Link: <https://icts-res-in.zoom.us/j/92047341785?pwd=lixmGYXVK2hcuFOSZIKuM9d3gH76yR.1>

Meeting ID: 920 4734 1785

Passcode: 943174