



**S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES**

Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Department of Astrophysics and High Energy Physics

19th January, 2023

11.30 AM

ONLINE/ FERMION

SPEAKER

**Dr. Swapnamay Mondal,
Postdoctoral Fellow
Dublin Institute for Advanced
Studies, Ireland**

TITLE OF THE TALK

Black hole microstates in String Theory

ABSTRACT

Quantum mechanically a black hole emits thermal radiation and has an entropy equalling a quarter of its surface area in Planck units. This implies the existence of black hole microstates, something inconceivable in classical gravity! In fact, the appearance of Planck units suggests Quantum Gravity holds the key to the puzzle. String theory, a theory of quantum gravity, indeed succeeds in explaining how black holes might have microstates. Furthermore, it reproduces black hole entropy from counting black hole microstates. I will discuss how this remarkable feat is achieved, and my contribution in this field. I will also discuss open questions and my related research plans, which include taking a complex systems approach to black hole microstates and possible application of machine learning techniques in this field.

HOST FACULTY

**Dr. S. Gangopadhyay, Associate Professor
ASTROPHYSICS AND HIGH ENERGY PHYSICS**
