

S E M I N A R



Prof Sameer Murthy
King's College London, UK

Date:

Tuesday, 30 July 2024

Time:

15h15-16h15 SAST

Venue:

- P213, Physics Building, East Campus, WITS
- Online

Who should attend?

All are welcome!

Enquiries:

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Gravitational index of the heterotic string

ABSTRACT:

The fundamental heterotic string has a tower of BPS states with an exponential growth in the charges. The fate of these BPS states at strong coupling is an old, much-debated topic: do they become a black hole or a string gas? I will discuss a new approach to this problem, i.e. the gravitational path integral dual to the supersymmetric index of these states. I will show that the saddle-point configuration of this path integral is a supersymmetric rotating non-extremal Euclidean black hole. Remarkably, the one-loop prepotential leads to a precise match of the gravitational and microscopic index. Thus, the nature of the BPS string at strong coupling depends on the precise observable being probed. The thermal ensemble is likely to transition to a winding condensate and a gas of strings without ever reaching a small black hole, while the index is captured by the rotating Euclidean black hole solution and smoothly connected to the microscopic ensemble.

Sameer Murthy graduated from the Indian Institute of Technology Bombay and earned his PhD at Princeton University under the supervision of Prof Nathan Seiberg. He subsequently held a research position at the Abdus Salam ICTP in Italy, a Marie Curie fellowship at the University of Paris, France, and a senior post-doctoral research position at Nikhef in the Netherlands where the organisation awarded him the NWO VIDI research grant for scientific research. In 2015 he received the prestigious ERC consolidator grant to lead a research team working on a research project involving quantum gravity, black holes, and modular forms. He moved to King's College London as a Lecturer in Theoretical Physics in September 2013, where he is Professor of Theoretical and Mathematical Physics. He is also a J. Robert Oppenheimer Visiting Professor at the Institute for Advanced Study in Princeton, USA.

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