



ICTS

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TATA INSTITUTE OF FUNDAMENTAL RESEARCH

## ICTS String Seminar

**Title** : Modular bootstrap for BPS black holes

**Speaker** : Sergey Alexandrov (Université Montpellier, France)

**Date** : Wednesday, 11 February 2026

**Time** : 3:30 PM (IST)

**Abstract** : BPS indices encoding the entropy of supersymmetric black holes in compactifications of Type II string theory on Calabi-Yau threefolds, known in mathematics as generalized Donaldson-Thomas invariants, possess remarkable (mock) modular properties. I'll explain the physical origin of mock modularity and show, for a set of one-parameter threefolds, how it can be used, together with wall-crossing and direct integration of topological string, to compute generating functions of D4-D2-D0 BPS indices. This in turn provides new boundary conditions for the holomorphic anomaly equation on the topological string partition function allowing to overcome the limitations of the direct integration method. In the end, I'll present preliminary results on the asymptotic growth of DT invariants, hinting for the existence of some phase transitions, and a new approximate formula for Gopakumar-Vafa invariants.

**Venue** : Emmy Noether Seminar Room

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

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