

Physics Seminar 9/13

Speaker: Alexander Frenkel

Title: Boundary Microstates of the 2d Non-supersymmetric Black Hole

Abstract: Large N theories are the leading candidates for a nonperturbative definition of string theory. A central goal in this family of dualities has been identifying the microstates of black holes and explicitly calculating the black hole free energy as the trace over a Hilbert space. Previous successful attempts at identifying and counting microstates have been focused on BPS states dual to zero-temperature extremal black holes. A web of dualities relates the 2d euclidean cigar (defined by a $SL(2, \mathbb{R})/U(1)$ coset WZW worldsheet theory) to the non-singlet sector of the $c=1$ matrix model at finite temperature. The string theory is bosonic but has a stable vacuum as the target space tachyon is massless. Earlier work by Kazakov, Kostov, Kutasov, Tseytlin, and others relied on euclidean path integral methods to reproduce the black hole free energy from the matrix model. In this talk I will discuss a recent work (<https://arxiv.org/abs/2210.11493>) in which we describe the black hole microstates and evaluate their entropy and energy directly in the Hamiltonian formulation. We find the black hole is described by a metastable bound state of a subset of the matrix eigenvalues.