

Physics Seminar: Saebyeok Jeong

Wednesday, April 20 · 1:30 – 2:30pm

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Title: Exact QFT duals of AdS black holes

Abstract: Recent studies showed that the $N=4$ superconformal index leads to the microstate counting of the BPS black holes in $AdS_5 \times S^5$. I will explain how we can enhance such an account of the AdS black hole entropy from the saddle point analysis of the matrix model for the $N=4$ index. Firstly, I will focus on the small black holes whose sizes are much smaller than the AdS radius. The saddle point equation can be solved exactly in this limit. The exact free energy obtained in this way gives a first principle account for the counting of the asymptotically flat black holes. Secondly, motivated by the previous exact solution for the small black holes, I will explain the saddle point equation can in fact be solved without taking any limit. I will show the saddles corresponding to the known BPS black holes arise as 'areal' distributions. The talk is based on <https://arxiv.org/abs/2111.10720> with Sunjin Choi, Seok Kim, and Eunwoo Lee; <https://arxiv.org/abs/2103.01401> with Sunjin Choi and Seok Kim.