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Wormholes and black hole microstates in AdS/CFT

Monday 12 July 2021 14:30 (15 minutes)

It has long been known that the coarse-grained approximation to the black hole density of states can be computed using classical Euclidean gravity. In this talk I will present evidence for another entry in the dictionary between Euclidean gravity and black hole physics, namely that Euclidean wormholes describe a coarse-grained approximation to the energy level statistics of black hole microstates. Our main result is an integral representation for wormhole amplitudes in Einstein gravity and in full-fledged AdS/CFT. These amplitudes are non-perturbative corrections to the two-boundary problem in AdS quantum gravity. The full amplitude is UV sensitive, dominated by small wormholes, but it admits an integral transformation with a macroscopic, weakly curved saddle-point approximation. In the boundary description this saddle appears to dominate a smeared version of the connected two-point function of the black hole density of states, and suggests level repulsion in the spectrum of AdS black hole microstates.

Are you are a member of the APS Division of Particles and Fields?

No

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