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Distinguishing black hole microstates: bulk and boundary perspectives

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Within supergravity (the low energy effective theory of string theory) there exist non-singular, horizonless solutions, called fuzzballs, with asymptotic charges M, J, Q coincident with the charges of a black hole. Two immediate questions arise: 1) Are these solutions viable candidates for microstates that make up the black hole entropy? 2) Can humans (asymptotic observers) distinguish between these solutions? In this talk I will report on our recent progress to answering these questions within the framework of AdS/CFT for a toy model for such microstate: an AdS generalization of the Damour-Solodukhin wormhole. In particular we calculate the quazi-normal modes in that geometry and relate them to poles of CFT correlators via the AdS/CFT dictionary. Then we study how close are these correlators to the thermal correlator (that is the standard black hole result) and comment on whether thermality bounds such as the eigenstate thermalization hypothesis allow for these solutions to enter in the black hole ensemble.

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