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Towards understanding the origin of the micro states of large black holes

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It is still an unsolved problem as to what are the microscopic degrees of freedom that account for the entropy of large black holes. In previous research which we quickly review, we proposed a general understanding of the origin of the micro states of black holes in an Euclidean setting in string theory based on the thermal scalar. Several recent lines of research point to the importance of edge states in partly or completely accounting for the black hole entropy. These edge states arise when the Hilbert space does not factorize and understanding their entanglement structure is paramount to understanding the entanglement of the degrees of freedom over the horizon and hence the black hole entropy. We review these developments and discuss our recent results on edge states and their entanglement structure in gauge theories.

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