Entanglement Entropy and Complexity in Random Systems[1]

RODRIGUEZ-LAGUNA JAVIER, Mathematics Dept, Universidad Carlos III, Madrid (Spain) — Entanglement is considered to be the hallmark of quantum physics, and entanglement entropy (EE) is one of its most natural measurements. Its utility as a marker for quantum criticality for random systems is well established. Recently, it has been shown that the scaling of the running-time in some quantum annealing methods is also related to it. In this work we show how the behaviour of this magnitude in some random systems can provide insight about the complexity of the structure of their quantum critical points. Moreover, we provide some hints that point towards a relation between the behaviour of the EE and the complexity class of classical problems. References: J. Rodriguez-Laguna, J. Phys. A: Math. Theor. 40, 12043 (2007), and JSTAT P05008 (2007).

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