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Complexity of a Quantum Circuit with Primary Fields in the Circuit Generator

Thursday 28 September 2023 16:26 (18 minutes)

In this talk I investigate a quantum circuit in a two-dimensional conformal field theory whose generating Hamiltonian includes primary fields. The motivation in the context of AdS/CFT is to access new bulk geometries dual to simple quantum circuits. The gate set of the boundary circuits, based on the stress tensor in previous work, is expanded through the inclusion of primary fields. I will present a simple model circuit where trivial time evolution is perturbed by a marginal primary for a finite time. The expectation value of the energy, the Fubini-Study cost and the quantum circuit complexity are derived to second order in perturbation theory. At late times, we find linear growth of complexity and an energy expectation value that suggests Vaidya black hole collapse as bulk dual. Based on work with Anna-Lena Weigel and Johanna Erdmenger.

Summary

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