



HARVARD UNIVERSITY
17 Oxford Street
Cambridge, MA 02138

Mathematical Picture Language Seminar



Tuesday, November 15

9:30 a.m. Boston time

Roy Garcia

Harvard University

Resource Theory of Quantum Scrambling

Abstract: Quantum scrambling refers to the spread of local quantum information into the many degrees of freedom of a quantum system. In this work, we introduce a resource theory of scrambling which incorporates two mechanisms, "entanglement scrambling" and "magic scrambling." We introduce two resource monotones called the Pauli growth and the OTOC (out-of-time-ordered correlator) magic for these two mechanisms, respectively. Moreover, we show that OTOC fluctuations are bounded by the OTOC magic. This proves that small OTOC fluctuations are an indication of magic in Google's recent experiment (Science 374, 1479 (2021)). We also show that both resource monotones can be used to bound the decoding fidelity in the Hayden-Preskill protocol. These applications provide an operational interpretation of the resource monotones defined in this work.



Zoom QR Code & Link:

<https://harvard.zoom.us/j/779283357?pwd=MitXVm1pYUIJVzZqT3lwV2pCT1ZUQT09>

<https://mathpicture.fas.harvard.edu/seminar>