Department of Theoretical Physics

THE QUANTUM SPACETIME SEMINAR SERIES

Fortuity in SYK models

(Zoom Seminar)

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Zoom link shall be shared separately

We study the fortuity phenomenon in supersymmetric Sachdev-Ye-Kitaev (SYK) models. For generic choices of couplings, all the BPS states in the $\mathcal{N}=2$ SUSY SYK model are fortuitous. The SYK models reveal an intimate connection between fortuity and the Schwarzian description of supersymmetric black holes, reflected in a sharp feature of R-charge concentration - microscopically, all the fortuitous states are concentrated in particular charge sectors. We propose that both R-charge concentration and the random matrix behavior near the BPS states are key properties of a generic q-local supercharge and formulate these as a supercharge chaos conjecture. We expect supercharge chaos to hold universally for supercharges in holographic CFTs near their fortuitous states, potentially providing a microscopic interpretation for the charge constraints of supersymmetric black holes.

We also construct SYK models that contain both fortuitous states and monotonous states and contrast their properties, providing further evidence that monotonous states are less chaotic than fortuitous states.