Contribution ID : **139** Type : **not specified**

D-commuting SYK model: building quantum chaos from integrable blocks

Sunday, 1 December 2024 14:50 (30)

We construct a new quantum chaotic model by combining multiple copies of integrable commuting SYK models. As each copy of the commuting SYK model does not commute with others, this construction breaks the integrability of each commuting SYK, and the family of models demonstrates the emergence of quantum chaos. We study the spectrum of this model analytically in the double-scaled limit. As the number of copies tends to infinity, the spectrum becomes compact and equivalent to the regular SYK model. For finite d copies, the spectrum is close to the regular SYK model in UV but has an exponential tail e^{E/T_c} in the IR. We identify the reciprocal of the exponent in the tail as a critical temperature T_c, above which the model should be quantum chaotic. T_c monotonically decreases as d increases, which expands the chaotic regime over the non-chaotic regime. We propose the existence of a phase transition around T_c, and the dynamics should be very different in two phases. We further carry out numeric analysis at finite d, which supports our proposal.

Presenter(s) : PENG, Cheng (UCAS, KITS)

Session Classification : Day 2: Parallel session II