

ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ &
ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/ CCQCN SEMINAR

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12:30-13:30

3rd Floor Seminar Room

Thermalization: Typicality of a single eigenstate?

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Abstract

In the ongoing discussion on thermalization in closed quantum many-body systems, the eigenstate thermalization hypothesis (ETH) has recently been proposed as a universal concept and has attracted considerable attention. So far, as the name states, this concept is hypothetical and roughly states the following: A single eigenstate is a typical representative of the full microcanonical ensemble. The vast majority of attempts to overcome this hypothetical character are based on exact diagonalization (ED) and, e.g., for spin chains limited to roughly 20 sites. Using ED, we will demonstrate that the ETH is indeed fulfilled in strongly nonintegrable systems while the ETH breaks down in certain regimes of integrable systems. To support the validity of the ETH in weakly nonintegrable systems as well, we introduce an alternative approach, thereby going significantly beyond system sizes accessible by ED. Our finite-size scaling is consistent with expectations for random-matrix models, i.e., deviations from the ETH decrease as a power law of the effective Hilbert-space dimension.

