MP 3: Quantum Mechanics

Time: Monday 17:15–17:55   Location: H-HS VII

MP 3.1   Mon 17:15   H-HS VII

Systematic construction of k-uniform states — •Zahra Raissi[1], Adam Teixid[1], Christian Gogolin[1,2,3], and Antonio Acin[1,4] for the A4-Collaboration — [1]ICFO-Institut de Ciencies Fotoniques, The Barcelona Institute of Science and Technology, 08860 Castelldefels (Barcelona), Spain — [2]Institut für Theoretische Physik, Universität zu Köln, 50937 Köln, Germany — [3]Xanadu, Toronto, M5V 1X6, Canada — [4]ICREA-Institució Catalana de Recerca i Estudis Avançats, 08010 Barcelona, Spain

Absolutely maximally entangled (AME) states are pure quantum states of n-partite systems of local dimension q with the property that all reduced states (marginals) of at most half the system size are maximally mixed. AME states are special cases of the class of so-called k-uniform states for $k = \lfloor n/2 \rfloor$. These states are useful for some protocols like multipartite teleportation, have connections with combinatorial designs, and quantum error correcting codes (QECC). They are also relevant for the construction of holographic codes.

To our knowledge, the only known systematic construction of these states is based on a class of classical error correction codes known as Maximum Distance Separable (MDS) code. In this work, we present a systematic method to construct other examples of k-uniform states.

We also show that the states derived through our construction are not Local Unitary (LU) equivalent to any k-uniform state constructed from minimum-distance separable codes.

MP 3.2   Mon 17:35   H-HS VII

Gibbs-Preserving Maps from the Perspective of Majorization — •Frederik vom Ende — TU Munich, 85748 Garching, Germany

Quantum channels which preserve some Gibbs-state play an important role in the resource theory of quantum thermodynamics and, more precisely, in connection with Thermo-Majorization.

Motivated by questions regarding reachability in coherently controllable open quantum systems with switchable coupling to a thermal bath, as well as recent developments of thermo-/d-majorization in the vector case (cf. arXiv:1911.01061), we generalize classical majorization from unital channels to channels with an arbitrary fixed point D of full rank.

Based on this we investigate generalized D-majorization in terms of order properties, unique maximal & minimal elements, topological aspects, etc. Moreover we will give characterizations of D-majorization in the qubit case and elaborate on why this is a challenging task when going beyond two dimensions.