Prof. Mag. Dr. Barbara Kraus |
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GUEST at the Chair of Quantum Algorithms and Applications July 16 – 20, 2023	
TALK of **Professor Julio de Vicente** Universidad Complutense Madrid Departamento de Matemáticas at Universidad Carlos III de Madrid	UNIVERSIDAD COMPLUTENSE MADRID mathQI
Time and date:	July 17, 2023 at 5.00 p. m.
Place:	Seminar room Rudolf-Mößbauer-Hörsaal 2501 PH-I 5101.EG.501 James-Franck-Str. 1, 85748 Garching
The invited Groups and all interested parties are cordially invited to attend the event!	**Condensed Matter Theory Groups:** **Prof.in Barbara Kraus,** Quantum Algorithms and Applications **Prof. Michael Knap,** Collective Quantum Dynamics **Prof. Johannes Knolle,** Theory Quantum Matter **Prof. Frank Pollmann,** Solid State Theory **Dr. Sergej Moroz,** Quantum Fluids **Prof. Wilhelm Zwerger,** Condensed Matter and Many-Body Theory

Asymptotic robustness of genuine multipartite entanglement in noisy quantum networks

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The study of entanglement in multipartite quantum states plays a major role in quantum information theory and genuine multipartite entanglement (GME) signals one of its strongest forms for applications.
However, its characterization is a highly nontrivial problem and its experimental preparation faces the formidable challenge of controlling quantum states with many constituents.
Quantum networks (that arise by distributing exclusively bipartite entanglement among given pairs of parties) represent a particularly feasible way to prepare multipartite entangled states and are now being actively investigated as a platform for quantum information tasks.
In this talk we study the ability of quantum networks to display GME when the distributed bipartite entanglement becomes noisy (i.e. mixed).
We will first observe that GME in networks depends on both the level of noise and the network topology and, in sharp contrast to the case of pure states, it is not guaranteed by the mere distribution of mixed bipartite entangled states.
More importantly, we will show that there is a markedly drastic feature: for some network configurations GME is robust to noise for any system size while for others it is completely washed out under the slightest form of noise for a sufficiently large number of parties.
This latter case implies fundamental limitations for the application of certain networks in realistic scenarios, where the presence of some form of noise is unavoidable.
We will then discuss how different parameters measuring the degree of connectivity in a network can characterize asymptotic survival of GME.