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SPEAKER

Dr. Amit Kumar Pal
Department of Physics
Swansea University, UK

TITLE

Entanglement in topological codes under noise

ABSTRACT

Entanglement is considered as resource in quantum information processing tasks. However, computation of the quantity is often challenging, particularly when the system is of large size, or when it is described by a mixed state -- for example, in the presence of noise. In this talk, we discuss how entanglement in a noisy topological code of large size, such as the Kitaev's surface code, or the topological color code, can be estimated. We demonstrate how graph states can be employed to determine entanglement between two distant qubits in these systems, and discuss how insight about the distance dependence of entanglement can be obtained. We also discuss an experimentally accessible methodology to estimate non-trivial lower bounds of entanglement in these systems.