Framework for classifying logical operators in stabilizer codes

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(Submitted on 30 Jan 2010)

Entanglement, as studied in quantum information science, and non-local quantum correlations, as studied in condensed matter physics, are fundamentally akin to each other. However, their relationship is often hard to quantify due to the lack of a general approach to study both on the same footing. In particular, while entanglement and non-local correlations are properties of states, both arise from symmetries of global operators that commute with the system Hamiltonian. Here, we introduce a framework for completely classifying the local and non-local properties all such global operators, given the Hamiltonian and a bi-partitioning of the system. This framework is limited to descriptions based on stabilizer quantum codes, but may be generalized. We illustrate the use of this framework to study entanglement and non-local correlations by analyzing global symmetries in topological order, distribution of entanglement and entanglement entro

Comments: 20 pages, 9 figures
Subjects: **Quantum Physics (quant-ph)**
Cite as: **arXiv:1002.0085v1 [quant-ph]**

Submission history

From: Beni Yoshida [view email]
[v1] Sat, 30 Jan 2010 20:01:38 GMT (796kb)

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