COMMUNICATION UNDER PHYSICAL RESTRICTIONS

SEMINAR

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Abstract

A limitation in the analysis of channel capacities is perhaps an overemphasis on mathematical elegance over consideration of realistic scenarios. We attempt to fill some of these shortcomings by developing a framework for analyzing classical capacities where the set of states for encoding information is restricted based on various physical properties. As examples, we consider constrained classical capacities of noiseless and noisy energy-preserving qubit channels. Next, we elucidate the effects of energetic restrictions on information transmission and quantum advantage for entanglement-assisted capacities. Here, we introduce an energy-constrained dense coding (DC) scheme, which we show to be optimal in d = 2. Interestingly, the restricted framework may potentially alter many fundamental results in the standard framework of communication. In particular, we establish that Classical-Quantum (CQ) channels can exhibit enhanced capacities under entanglement assistance in the energy-constrained setting, an effect shown to be impossible in the unrestricted scenario. I will conclude with some of our results on quantum teleportation, focusing on fidelity deviation and the role of prior information.

Everyone is invited to attend