

Contribution Title: OPTIMAL DECOUPLING
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Given a bipartite quantum system with parts A and B, part A can be "decoupled" from B by tracing over a (sufficiently large) randomly chosen subsystem of A. Decoupling is used in a variety of information-theoretic arguments, e.g., in the context of the black hole information paradox. It also lies at the heart of various quantum communication protocols, e.g., for state merging or state redistribution.

In this talk, I show that decoupling of a non-trivial part of A from B is possible if and only if the smooth min-entropy of A given B is larger than a certain threshold. This result can be used to obtain improved bounds on the communication complexity of various tasks. In particular, it yields a tight characterization of the communication needed for state merging in the most general (non-i.i.d.) case.