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A reverse Shannon theorem for quantum broadcast channels

A reverse Shannon theorem characterizes the resources required to simulate a given noisy channel. The quantum reverse Shannon theorem for single-sender/single-receiver channels, a joint effort of Bennett, Devetak, Harrow, Shor and Winter, established that a single number can be used to characterize the strength of such channels in the presence of free entanglement. In this talk I'll explain how to prove an optimal reverse Shannon theorem for quantum channels with a single sender but many receivers, known as broadcast channels. Surprisingly, the simulation cost for a broadcast channel can be characterized by a simple, tractable optimization problem even though no such simple solution has been found for the capacity region itself, even in the classical case.

Joint work with Frederic Dupuis.