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Quantum communication with zero-capacity channels

A quantum channel models a physical process in which noise is added to a quantum system via interaction with its environment. Protecting quantum systems from such noise can be viewed as an extension of the classical communication problem introduced by Shannon sixty years ago. A fundamental quantity of interest is the quantum capacity of a given channel, which measures the amount of quantum information which can be protected, in the limit of many transmissions over the channel. In this talk, I will show that certain pairs of channels, each with a capacity of zero, can have a strictly positive capacity when used together, implying that the quantum capacity does not completely characterize a channel's ability to transmit quantum information.

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