APPLIED MATHEMATICS COLLOQUIUM

ASSISTED CAPACITIES OF QUANTUM CHANNELS

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ABSTRACT:

Any process whereby a quantum system passes from a sender to a receiver, possibly interacting with some environment en route, may be regarded as a quantum channel. Unlike their classical analogs, quantum channels have multiple capacities depending on what one is trying to use them for (e.g. classical or quantum communication) and what auxiliary resources are brought into play. I review these capacities and the progress in associating them with simple entropic expressions such as Holevo information and quantum mutual information. Among auxiliary resources, sender-receiver entanglement has a simplifying effect: in its presence all quantum channels become efficiently interconvertible (quantum reverse Shannon theorem). By contrast, classical feedback, or source-independent bidirectional classical side communication, which have no effect on a classical channel's single capacity, have a complicated effect on quantum channels, sometimes increasing both their quantum and capacities to values between the unassisted and the entanglement-assisted values. Joint work with Peter Shor, Igor Devetak, John Smolin and Andreas Winter.

MONDAY, MARCH 14, 2005
4:15 PM
Building 4, Room 231

Refreshments at 3:30 PM in Building 2, Room 349.

Applied Math Colloquium: http://www-math.mit.edu/amc/spring05
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