

## Quantum Physics

# The Algebraic Measure of a Hidden Markov Quantum Memory Channel

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This paper was presented in poster form at and in the proceedings of the QCMC 2008. It is a summary of a fuller paper to appear separately. The classical product state capacity of a noisy quantum channel with memory is investigated. A forgetful noise-memory channel is constructed by Markov switching between two depolarizing channels which introduces non-Markovian noise correlations between successive channel uses. This function of a Markov process can be reformulated as an algebraic measure. This framework provides an expression for the asymptotic entropy rate and thus enables the calculation of the classical capacity. The effects of the hidden-Markovian memory on the capacity are explored. An increase in noise-correlations is found to increase the capacity.

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