Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Recoverability in quantum information theory[1] MARK WILDE, Louisiana State Univ - Baton Rouge — The fact that the quantum relative entropy is non-increasing with respect to quantum physical evolutions lies at the core of many optimality theorems in quantum information theory and has applications in other areas of physics. In this work, we establish improvements of this entropy inequality in the form of physically meaningful remainder terms. One of the main results can be summarized informally as follows: if the decrease in quantum relative entropy between two quantum states after a quantum physical evolution is relatively small, then it is possible to perform a recovery operation, such that one can perfectly recover one state while approximately recovering the other. This can be interpreted as quantifying how well one can reverse a quantum physical evolution. Our proof method is elementary, relying on the method of complex interpolation, basic linear algebra, and the recently introduced Renyi generalization of a relative entropy difference. The theorem has a number of applications in quantum information theory, which have to do with providing physically meaningful improvements to many known entropy inequalities. This is based on arXiv:1505.04661, now accepted for publication in Proceedings of the Royal Society A.

[1]I acknowledge support from startup funds from the Department of Physics and Astronomy at LSU, the NSF under Award No. CCF-1350397, and the DARPA Quiness Program through US Army Research Office award W31P4Q-12-1-0019.

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Date submitted: 11 Sep 2015 Electronic form version 1.4