

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Mismatched quantum filtering and entropic information¹

MANKEI TSANG, National University of Singapore — Quantum filtering is a signal processing technique that estimates the posterior state of a quantum system under continuous measurements and has become a standard tool in quantum information processing, with applications in quantum state preparation, quantum metrology, and quantum control. If the filter assumes a wrong model due to assumptions or approximations, however, the estimation accuracy is bound to suffer. In this talk I shall present formulas that relate the error penalty caused by quantum filter mismatch to the relative entropy between the true model and the nominal model, with one formula for Gaussian measurements, such as homodyne detection, and another for Poissonian measurements, such as photon counting. These formulas generalize recent seminal results in classical information theory and provide new operational meanings to relative entropy, mutual information, and channel capacity in the context of quantum experiments. See <http://arxiv.org/abs/1310.0291> for details.

¹This work is supported by the Singapore National Research Foundation under NRF Grant No. NRF-NRFF2011-07.

Mankei Tsang
National University of Singapore

Date submitted: 12 Nov 2013

Electronic form version 1.4