Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Error correction with machine learning: one man's syndrome measurement is another man's treasure JOSHUA COMBES, University of New Mexico, HANS BRIEGEL, Universitat Innsbruck, CARLTON CAVES, CHRISTOPHER CESARE, CHRISTOPHER FERRIE, University of New Mexico, GERARD MILBURN, The University of Queensland, MARKUS TIERSCH, Universitat Innsbruck — Syndrome measurements that are made in quantum error correction contains more information than is typically used. We show using the data from syndrome measurements (that one has to do anyway) the following: (1) a channel can be dynamically estimated; (2) in some situations the information gathered from the estimation can be used to permanently correct away part of the channel; and (3) can allow us to perform hypothesis testing to determine if the errors are correlated or if the error rate exceeds the "expected worst case". The unifying theme to these topics is making use of all of the information in the data collected from syndrome measurements with a machine learning and control algorithms.

Joshua Combes
University of New Mexico

Date submitted: 14 Nov 2013 Electronic form version 1.4