Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Linear optical quantum metrology with single photons – Experimental errors, resource counting, and quantum Cramér-Rau bounds NICHOLAS STUDER, Louisiana State University, JONATHAN OLSON, Harvard University, KEITH MOTES, Macquarie University, PATRICK BIRCHALL, University of Bristol, MARGARITE LABORDE, TODD MOULDER, Louisiana State University, PETER ROHDE, University of Technology Sydney, JONATHAN DOWLING, Louisiana State University — Quantum number-path entanglement is a resource for super-sensitive quantum metrology and in particular provides for sub-shotnoise or even Heisenberg-limited sensitivity. However, such number-path entanglement has thought to have been resource intensive to create in the first place – typically requiring either very strong nonlinearities, or nondeterministic preparation schemes with feed-forward, which are difficult to implement. Recently we showed that number-path entanglement from a BOSONSAMPLING inspired interferometer can be used to beat the shot-noise limit. In this work, we compare and contrast different interferometric schemes, discuss resource counting, calculate exact quantum Cramer-Rao bounds, and study details of experimental errors.

Nicholas Studer
Louisiana State University

Date submitted: 29 Jan 2017 Electronic form version 1.4