Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optimal quantum-enhanced interferometry using a laser power source[1] MATTHIAS LANG, CARLTON CAVES, University of New Mexico — We consider an interferometer powered by laser light (a coherent state) into one input port and ask the following question: what is the best state to inject into the second input port, given a constraint on the mean number of photons this state can carry, in order to optimize the interferometer's phase sensitivity? This question is the practical question for high-sensitivity interferometry. We answer the question by considering the quantum Cramer-Rao bound for such a setup. The answer is squeezed vacuum, if there are no photon losses in the interferometer. For a lossy interferometer, the squeezed vacuum is the best choice for the practical case where the laser power is much bigger than the power put into the squeezing.

[1]This work was supported in part by National Science Foundation Grants No. PHY-1212445 and PHY-1005540 and by Office of Naval Research Grant No. N00014-11-1-0082.

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Date submitted: 14 Nov 2013 Electronic form version 1.4