

Holland and Burnett Reply: The authors of the Comment [1] are quite correct in asserting that the Holland-Burnett scheme needs more than a just a measurement of the mean values at the output ports. The careful reader will observe the symmetric photon number difference distribution plotted in Fig. 4 in our original Letter. For this reason the procedure discussed in the original Letter was used to simulate the noise bursts which would be observed in the photocurrent difference.

It should be pointed out that a more subtle but crucial consideration in our original Letter was that even for the ideal device we found it necessary to utilize multiple measurements (referred to as modes) which should be combined through a Bayesian probability treatment in order to efficiently realize an operational interferometer at the Heisenberg limit. This operational procedure is, of course, not represented by a statistical expectation value.

In subsequent work with others we have focused on extending the formulation. In the work of the JILA theory group, the effects of detector efficiency and imperfect squeezing have been examined in some detail. Recent work at Oxford has shown that number fluctuations can

be read out through interaction effects between ultracold atoms. This presents, in our opinion, an important potential route for Heisenberg limited precision measurements. The parity detection scheme that the authors of the Comment allude to may well prove another important route for the implementation of Heisenberg limited measurements.

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[1] C. C. Gerry, R. A Campos, and A. Benmoussa, preceding Comment, Phys. Rev. Lett. **92**, 209301 (2004).