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Multiparameter estimation with single photons SUSHOVIT ADHIKARI, CHENGLONG YOU, MARGARITE LABORDE, JONATHAN DOWLING, Department of Physics and Astronomy, Louisiana State University, JONATHAN OLSON, Department of Chemistry and Chemical Biology, Harvard University — It was suggested in [Phys. Rev. Lett. 111, 070403] that optical networks with relatively simple preparation and measurement devices – single photon Fock states and on-off detectors – can show significant improvements over classical strategies for multiparameter estimation when the number of modes in the network is small. This was further developed in [arXiv:1610.07128] for the case of single parameter estimation, and shown to be sub-shotnoise only for n<7. In this paper, we show that this simple strategy can give asymptotically post-classical sensitivity for multiparameter estimation even when the number of modes is large. Additionally, we consider the effects of several other measurement techniques that can increase the efficiency of this device.

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