

Abstract Submitted
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Weak value amplification considered harmful CHRISTOPHER FERRIE, JOSHUA COMBES, Center for Quantum Information and Control, University of New Mexico — We show using statistically rigorous arguments that the technique of weak value amplification does not perform better than standard statistical techniques for the tasks of parameter estimation and signal detection. We show that using all data and considering the joint distribution of all measurement outcomes yields the optimal estimator. Moreover, we show estimation using the maximum likelihood technique with weak values as small as possible produces better performance for quantum metrology. In doing so, we identify the optimal experimental arrangement to be the one which reveals the maximal eigenvalue of the square of system observables. We also show these conclusions do not change in the presence of technical noise.

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