Title:	Weak measurement-based state estimation of Gaussian states of one-variable quantum systems
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Abstract:	We present a scheme to estimate Gaussian states of one-dimensional continuous variable systems, based on weak (unsharp) quantum measurements. The estimation of a Gaussian state requires us to find position (q), momentum (p) and their second order moments. We measure q weakly and follow it up with a projective measurement of p on half of the ensemble, and on the other half we measure p weakly followed by a projective measurement of q. In each case we use the state twice before discarding it. We compare our results with projective measurements and demonstrate that under certain conditions such weak measurement-based estimation schemes, where recycling of the states is possible, can outperform projective measurement-based state estimation schemes. We establish beyond statistical fluctuations that our method works better for small ensemble sizes
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