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Inaccuracy in Quantum State Tomography - What is to Be Done?[1] TRAVIS SCHOLTEN, University of New Mexico, Sandia National Laboratories — Quantum state tomography is a set of techniques for estimating quantum states from the statistics of measurement outcomes. State tomography of continuous-variable systems, such as optical modes, is difficult because formally the state space is infinite dimensional. Thus, in order to have an accurate estimate, some "good" dimension must be chosen. This dimension must be identified on the fly, where the data themselves are used to quantify the accuracy of the estimate. Several techniques from classical statistics, collectively known as model selection, provide us with ways of estimating the inaccuracy. One such technique, the Akaike Information Criterion (AIC), relates inaccuracy to the Hilbert space dimension of the estimate. I will show - surprisingly - that the AIC does not reliably predict the inaccuracy for estimating continuous-variable quantum states, suggesting the AIC is not an appropriate model selection technique for these systems, and that new criteria are needed.

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