Practical variational tomography for critical 1D systems

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— We further investigate a recently introduced efficient quantum state reconstruction procedure targeted to states well-approximated by the multi-scale entanglement renormalization ansatz (MERA). First, we introduce an improved optimization scheme that can be easily generalized for MERA states with larger bond dimension. Second, we provide a detailed analysis of the error propagation and quantify how it affects the distance between the experimental state and the reconstructed state. Third, we explain how to bound this distance using local data, providing an efficient scalable certification method. Fourth, we examine the performance of MERA tomography on the ground states of several 1D critical models.