

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Reliability of analog quantum simulation MOHAN SAROVAR, Sandia National Laboratories, Livermore, USA, JUN ZHANG, LISHAN ZENG, Joint Institute of UMich-SJTU, Key Laboratory of System Control and Information Processing (MOE), Shanghai, China — Analog quantum simulators (AQS) will likely be the first nontrivial application of quantum technology for predictive simulation. However, there remain questions regarding the degree of confidence that can be placed in the results of AQS since they do not naturally incorporate error correction. We formalize the notion of AQS reliability to calibration errors by determining sensitivity of AQS outputs to underlying parameters, and formulate conditions for robust simulation. Our approach connects to the notion of parameter space compression in statistical physics and naturally reveals the importance of model symmetries in dictating the robust properties. This work was supported by the Laboratory Directed Research and Development program at Sandia National Laboratories. Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the United States Department of Energy's National Nuclear Security Administration under Contract No. DE-AC04-94AL85000.

Mohan Sarovar
Sandia National Laboratories, Livermore, USA

Date submitted: 11 Nov 2016

Electronic form version 1.4