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Noise diagnostics using one-dimensional quantum cellular automata YOUNG SOON KIM[1], Myongji University, MATTHEW DAVIDSON, Catholic University, GAVIN BRENNEN, NIST, CARL WILLIAMS, NIST — We study propagation of correlated errors during quantum simulation due to global pulse errors. Our model system consists of a one dimensional alternating array of two distinct species (or subspaces) of atoms distributed in n lattice sites with a nearest neighbor Ising-type interaction. Time evolution is generated according to a set of quantum cellular automata (QCA) rules which can be implemented through application of global control pulses on either species. We characterize the fidelity for generating entangled states and discuss how to use the system as a sensitive detector of environmental noise. We discuss how to build an architecture suitable for ensemble QCA experiments using a two-dimensional optical lattice.

[1]On sabbatical leave at NIST

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