Entangled Dynamics of the Transverse Quantum Ising Model at Finite Temperature[1] DANIEL JASCHKE, KENJI MAEDA, WEI HAN, Department of Physics, Colorado School of Mines, Golden, Colorado 80401 USA, TOMMASO CALARCO, SIMONE MONTANGERO, Center for Integrated Quantum Science and Technology; Institute for Complex Quantum Systems, Universität Ulm, D-89069 Ulm, Germany, LINCOLN D. CARR, Department of Physics, Colorado School of Mines, Golden, Colorado 80401 USA — An outstanding question in entangled dynamics of quantum phase transitions is the role of finite temperature. We study this problem in the context of ultracold molecules in optical lattices, which exhibit the tranverse quantum Ising model. We use both time-dependent matrix product density operator (MPDO) and matrix-product-state (MPS) methods based on tensor networks to compare zero and finite temperature dynamics, the latter represented by the Gibbs distribution. Explorations include local and global quantum quenches and the spreading of correlations.

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