Quench dynamics of entanglement entropy in the toric code\textsuperscript{1}
ARMIN RAHMANI, CLAUDIO CHAMON, Boston University — We calculate analytically the time-dependent entanglement entropy of a spin system described by the toric code Hamiltonian when quenched from a fully magnetized initial state. We argue that, in the presence of disorder, the entanglement entropy saturates to values which, due to integrability, scale as the area of the subsystem as opposed to its volume. This sudden quantum quench from the magnetic phase into the topological phase does not create any topological order. Finally we study the effects of integrability-breaking perturbations on the quench dynamics.

\textsuperscript{1}DOE Grant DE-FG02-06ER46316

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Date submitted: 19 Nov 2009

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