

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Turning back time in the optical lattice: How to measure the fidelity of a quantum simulation. FERNANDO CUCCHIETTI, Los Alamos National Laboratory — I show how to perform a Loschmidt echo (time reversal) in the Bose-Hubbard model implemented with cold bosonic atoms in an optical lattice. The echo is obtained by applying a linear phase imprint on the lattice and a change in magnetic field to tune the boson-boson scattering length through a Feshbach resonance. I discuss how the echo can measure the fidelity of the quantum simulation, and also the intensity of an external potential (e.g. gravity), or the critical point of the superfluid-insulator quantum phase transition.

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Date submitted: 17 Nov 2006

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