Abstract Submitted
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Turning back time in the optical lattice: using the Loschmidt echo as a sensor FERNANDO CUCCHIETTI, Los Alamos National Labs — I will show how to perform a time reversal of the dynamics of cold bosonic atoms in an optical lattice. The time reversal creates a Loschmidt echo and 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 will discuss how to use the echo as a sensor to measure intensities of external potentials (e.g. gravity, magnetic fields, etc.), and also interesting quantities such as the fidelity of the quantum simulation of the Bose-Hubbard Hamiltonian, and the critical point and exponents of the superfluid-insulator quantum phase transition in this model.

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