

Abstract Submitted  
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**The dynamics of quantum criticality: Quantum Monte Carlo and holography** WILLIAM WITCZAK-KREMPA, Perimeter Institute for Theoretical Physics, ERIK SORENSEN, McMaster University, SUBIR SACHDEV, Harvard University — Understanding the real time dynamics of systems near quantum critical points at finite temperature constitutes an important yet challenging problem. We present quantum Monte Carlo results for 2 separate realizations of the superfluid-insulator transition of bosons on a lattice: their low-frequency conductivities are found to have the same universal dependence on imaginary frequency and temperature. We use the structure of the real time dynamics of conformal field theories described by the holographic gauge/gravity duality to make progress on the difficult problem of analytically continuing the Monte Carlo data to real time. Our method yields quantitative and experimentally testable results on the frequency-dependent conductivity near the quantum critical point. Connections to other observables and universality classes are discussed, as well as new holographic extensions.

William Witzak-Krempa  
Perimeter Institute for Theoretical Physics

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