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Universal scaling of conductivity at the superfluid-insulator quantum phase transition from numerical simulations JURIJ SMAKOV, ERIK SORENSEN, McMaster University — We address the question of universal conductivity scaling at the insulator-superfluid quantum phase transition by studying the Bose-Hubbard model numerically, using stochastic series expansion (SSE) technique, at two different quantum critical points. With SSE we are able to directly measure the current-current correlation function (related to the conductivity) as a function of Matsubara frequencies. By doing proper data analysis we demonstrate how the universal scaling behavior of conductivity (and the breakdown thereof) may be observed in the numerical simulations. We also attempt to analytically continue the imaginary-frequency data using MaxEnt and stochastic analytic continuation methods.

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