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Interactions produce strongly non-Gaussian spatial correlations of the screened random potential H. JAVAN MARD, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL, E.C. ANDRADE, Technische Universitaet Dresden, Dresden, Germany, E. MIRANDA, Univ. of Campinas,Campinas,SP,Brazil, V. DOBROSAVLJEVIĆ, Department of Physics and National High Magnetic Field Laboratory, Florida State University, Tallahassee, FL — We perform variational studies of the interaction-localization problem[1], by using both the Hartree-Fock and the Gutzwiller (slave boson) approximations to describe the interaction-induced renormalizations of the effective (screened) random potential seen by quasiparticles. Here we present results of careful finite-size scaling studies for the conductance of disordered Hubbard chains at half-filling and zero temperature. While our results indicate that quasiparticle wavefunctions remains exponentially localized even in presence of moderate to strong repulsive interactions, we find surprisingly strong enhancement of the conductance of finite size systems. In particular, we show that interactions produce a strong decrease of the characteristic conductance scale g^* signaling the onset of strong localization. We show that this effect, which cannot be captured by a simple renormalization of the disorder strength, instead reflects a peculiar *non-Gaussian form for the spatial correlations* of the screened disordered potential, a so-far neglected mechanism to suppress the role of Anderson localization (interference) effects.

[1]V. Dobrosavljević, N. Trivedi, and J. M. Valles Jr, *Conductor Insulator Quantum Phase Transitions* (Oxford University Press, UK, 2012).

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