Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Charge density waves in disordered media circumventing the Imry-Ma argument NORM TUBMAN, University of California, Berkeley, HITESH CHANGLANI, TAYLOR HUGHES, University of Illinois — Two powerful theoretical predictions, Anderson localization and the Imry-Ma argument, impose significant restrictions on which phases of matter can exist in the presence of even the smallest amount of disorder in one-dimensional systems. These predictions forbid conducting states and ordered states respectively. It was thus of great interest to find out that Anderson localization can indeed be circumvented in one dimensional systems in the presence of correlated disorder. In a similar manner, but for a different physical phenomenon, we show that the Imry-Ma argument can be circumvented resulting in the formation of stable ordered states in disordered one dimensional systems. We explicitly simulate a family of Hamiltonians of spinless fermions with correlated disorder, where we find that a charge density wave is stable up to a finite critical disorder strength. Having circumvented the Imry-Ma mechanism, we then investigate other mechanisms in which disordered systems can destroy an ordered state.

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Date submitted: 05 Nov 2015 Electronic form version 1.4