

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**An interacting adiabatic quantum motor** SILVIA VIOLA KUSMINSKIY, University Erlangen-Nrnberg, ANTON BRUCH, FELIX VON OPPEN, Freie Universitt Berlin — We consider the effect of electron-electron interactions on the performance of an adiabatic quantum motor based on a Thouless pump operating in reverse. We model such a device by electrons in a 1d wire coupled to a slowly moving periodic potential associated with the classical mechanical degree of freedom of the motor. This periodic degree of freedom is set into motion by a bias voltage applied to the 1d electron channel. We investigate the Thouless motor with interacting leads modeled as Luttinger liquids. We show that interactions enhance the energy gap opened by the periodic potential and thus the robustness of the Thouless motor against variations in the chemical potential. We show that the motor degree of freedom can be described as a mobile impurity in a Luttinger liquid obeying Langevin dynamics with renormalized coefficients due to interactions, for which we give explicit expressions.

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Date submitted: 06 Nov 2015

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