

Abstract Submitted
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Negative Differential Conductivity in an Interacting Quantum Gas BODHADITYA SANTRA, RALF LABOUVIE, SIMON HEUN, Kaiserslautern University of Technology, SANDRO WIMBERGER, University of Heidelberg, HERWIG OTT, Kaiserslautern University of Technology — Negative differential conductivity (NDC) is a widely exploited mechanism in many areas of research dealing with particle and energy transport. We experimentally realize such a many body quantum transport system based on ultracold atoms in a periodic potential. We prepare our system by loading Bose condensed rubidium atoms in a 1D optical lattice with high atom occupancy per lattice site. Subsequently, we remove all the atoms from a central lattice site. While the atoms from neighboring sites tunnel into the empty site, we observe NDC in the resulting current voltage characteristics and investigate the microscopic mechanism behind it [1].

[1] R. Labouvie, B. Santra, S. Heun, S. Wimberger, H. Ott, arXiv:1411.5632

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