

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Pair tunneling through single molecules JENS KOCH, Institut für Theoretische Physik, Freie Universität Berlin, Arnimallee 14, 14195 Berlin, Germany, MIKHAIL E. RAIKH, Department of Physics, University of Utah, Salt Lake City, UT 84112, USA, FELIX VON OPPEN, Institut für Theoretische Physik, Freie Universität Berlin, Arnimallee 14, 14195 Berlin, Germany — By a polaronic energy shift, the effective charging energy of molecules can become negative, favoring ground states with even numbers of electrons. Here, we show that charge transport through such molecules near ground-state degeneracies is dominated by tunneling of electron pairs which coexists with (featureless) single-electron cotunneling. Due to the restricted phase space for pair tunneling, the current-voltage characteristics exhibits striking differences from the conventional Coulomb blockade. In asymmetric junctions, pair tunneling can be used for gate-controlled current rectification and switching. We find that pair tunneling also has interesting consequences for the shot noise.

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Date submitted: 23 Nov 2005

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