

Abstract Submitted
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What is Quantum in Quantum Pumping: The role of the Phase and Asymmetries KUNAL DAS, Fordham University, TOMAS OPATRNY, Palacky University — By studying several examples, we show that quantum pumping does not always necessitate a strictly quantum description, neither is phase always a necessary concept. The same quantum mechanical picture of pumping encompass a variety of distinct mechanisms, some can be simulated by classical mechanisms while others can be explained only in a quantum picture; the role of the phase of the wavefunction is the crucial differentiator. We also show that most pumping processes have a previously unconsidered antisymmetric component which contributes significantly to the instantaneous current at each terminal but causes no net charge transfer . We have also computed the exact pumped current for arbitrary rates of time variation for certain potentials, not just in the adiabatic regime as has been previously studied.

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