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Adiabatic Electron Pumping through Graphene-based Nanoelectromechanical Resonators CAIO LEWENKOPF, Universidade Federal Fluminense, ALEXANDER CROY, Chalmers University of Technology — We theoretically investigate the adiabatic electronic transport through graphene-based nanoelectromechanical resonators. The device is modeled by an effective long-wavelength Hamiltonian (given by the Dirac equation) for the electrons and using the continuum elastic theory for the mechanical motion. One obtains the equations of motion describing the system dynamics employing a non-equilibrium Green's function theory. Due to the mutual coupling between the electronic and mechanical degrees of freedom, both sets of equations have to be solved self-consistently. We present analytical and numerical results of the pumped charge and the mechanical response for a typical resonator setup. We also discuss the role of non-adiabatic corrections and the resulting damping of the mechanical motion.

Caio Lewenkopf
Universidade Federal Fluminense

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