Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Landauer-Buettiker approach to current-induced forces in nanoelectromechanical systems SILVIA VIOLA KUSMINSKIY, NIELS BODE, Dahlem Center for Complex Quantum Systems & Fachbereich Physik, Freie Universitaet Berlin, REINHOLD EGGER, Heinrich-Heine Universitaet, Duesseldorf, Germany, FELIX VON OPPEN, Dahlem Center for Complex Quantum Systems & Fachbereich Physik, Freie Universitaet Berlin — We study current-induced forces in nanoelectromechanical systems with coupling between electronic and mechanical degrees of freedom. We focus on the regime where the mechanical motion is slow and Coulomb blockade effects can be neglected. We derive the current-induced forces both in and out of equilibrium and give the conditions under which these forces can be expressed solely in terms of the S-matrix. We pay particular attention to situations with more than one mechanical degree of freedom which are characterized by several qualitatively new features. We apply our general results to some simple examples.

Silvia Viola Kusminskiy
Dahlem Center for Complex Quantum Systems &
Fachbereich Physik, Freie Universitaet Berlin

Date submitted: 24 Nov 2010 Electronic form version 1.4