# Single Electron Transport in Nanoelectromechanical System (NEMS)

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Nanotechnology has advanced the ability to fabricate systems in which semiconductor materials can be defined as the functional and structural units of nanoelectronic devices. The mechanical degrees of freedom of these devices in a certain environment can play an important role in that charge transfer via tunneling can be enhanced by mechanical motion. Along this line of thought, nanoelectromechanical devices are realized as nanopillars made of a silicon base with a small metallic tip on top. Coulomb controlled electron tunneling facilitated by mechanical motion is investigated [1]. Also, the nonzero dc current through this system by external ac excitation is observed via dynamical symmetry breaking [2]. This is of importance in terms of realizing a system that exploits the fundamental quantization of charge as well as having applications such as mixers, switches, and mechanically clocked electron.

References

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[2] Chulki Kim, Jonghoo Park, and Robert H. Blick, *Phys. Rev. Lett.* **2010**, *105*, 067204.