

# Colloquium Notice

**Lev Mourokh**

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*Theory and applications of charge transport in  
nanoelectromechanical systems*

The interplay of electronic and mechanical properties of nanoelectromechanical systems (NEMS) has been a focal point of research interest in recent years. In this talk, after providing a brief overview of the experimental realizations of such systems, I will present our analysis of two important NEMS structures, a mechanical oscillator (cantilever) coupled to an electrical tunnel junction and a quantum shuttle. Explicit expressions for the oscillator (shuttle) damping/decoherence rate, fluctuations of the oscillator (shuttle) position, and the nonlinear conductance of these NEMS have been obtained on a microscopic basis and their voltage and temperature dependencies have been determined. I will also outline my future plans for research in this field, discussing the feasibility of realizing a coherent phonon source using the suspended nanobridges, electron transport in manganites, and electromechanical processes in living objects. In the latter case, a novel bio-inspired system, nanorotator, will be discussed. Towards the end of my talk, I will describe other projects in which I am involved, concerning electrical and optical properties of semiconductor nanostructures.

Thursday

**March 13, 2008**

Starts at 12:15 PM

Coffee at 12:00 PM

Physics Conference Room, SB B326