Seminar/Talk

Mechanics towards the quantum limit

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Host: Georgios Katsaros

Nanotubes are ideal for exploring the boundary between classical and quantum motion, combining low mass (large zero-point motion), high stiffness (large mode spacing), and high quality factor (long coherence times). I will focus on mechanical displacement approaching the standard quantum limit near the phonon ground state. I will show sensitive optomechanical probing of the vibrations of a suspended carbon nanotube at milliKelvin temperatures [1,2]. With quantum dots embedded in the carbon nanotube, I will demonstrate the impact of electron tunnelling on the mechanical motion, including the excitation of self-oscillations. I will also discuss the feasibility of experiments that, combining electrical and mechanical degrees of freedom, might enable a key capability for experiments on quantum thermodynamics: direct measurements of work exchange in the quantum regime.References[1] N. Ares et al., Phys. Rev. Lett. 117, 170801 (2016) [2] Y. Wen et al., arXiv:1808.04687 (2018)

Tuesday, October 2, 2018 11:00am - 12:30pm
Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

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