

CEITEC – Central European Institute of Technology, Brno University of Technology would like to inform you about the on-coming lecture:

Prof. Lukas Novotny

(ETH Zürich, Switzerland)

Optical cooling and amplification of a vacuum-trapped nanoparticle

 **Wednesday, 14:00**

**Room P6
Faculty of Mechanical Engineering
Brno University of Technology
Technická 2**

2/11/2016

I discuss our experiments with optically levitated nanoparticles in ultrahigh vacuum. Using an active parametric feedback scheme we cool the particle's center-of-mass temperature to $T = 500$ micro-Kelvins and reach mean quantum occupation numbers of $n = 50$. I show that mechanical quality factors of $Q = 10^9$ can be reached and that damping is dominated by photon recoil heating. The vacuum-trapped nanoparticle forms an ideal model system for studying non-equilibrium processes, nonlinear interactions, and ultras-small forces.