Physikalisches Kolloquium — Physics Colloquium

Einladung — **Invitation**

Monday, 18 May 2026

Lecture Hall O25/H2, at 16:15
Coffee and cookies will be served in front of the lecture hall from 16:00

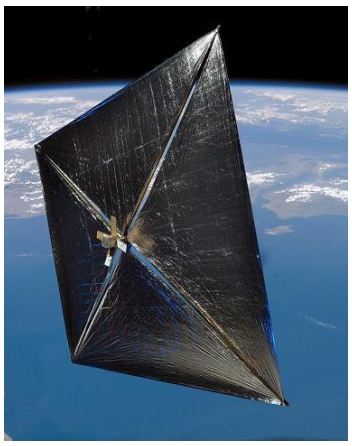
Forces of Light: from solar sails to nanoparticle cooling

Prof. Pavel Zemánek

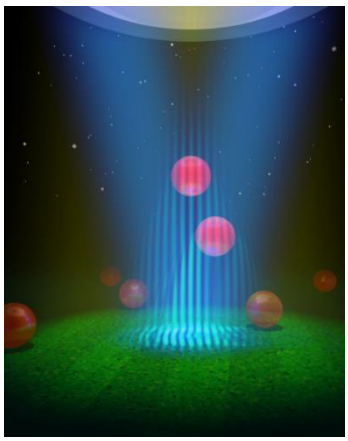
Institute of Scientific Instruments of the CAS
Academy of Sciences of the Czech Republic,
Brno, Czech Republic

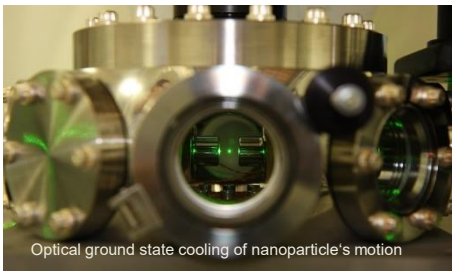
http://isibrno.cz/en/microphotonics

The talk briefly introduces the origin of the force of light and its history from Johannes Kepler's time to the most recent effort of optical cooling of nanoparticles.



We will start with radiation pressure and its use for propelling satellites using solar sails, and then proceed to spatial shaping of the laser beam's intensity and phase to enable much more complex manipulation of objects at the microscale. A brief review of examples and applications will be presented, including holographic optical tweezers, measurement of tiny pN forces between biomolecules, optical rotors, sorting of objects by light sieves, pulling and pushing of objects by optical "tractor" beams, various forms of self-arrangement of microparticles into so-called optically bound matter, and cooling the mechanical motion of nanoparticles down to the quantum limit.





Host: Prof. Benjamin Stickler, Institute of Complexe Quantum Systems

Organisation: Prof. Dr. Jens Michaelis, Institute of Biophysics, jens.michaelis@uni-ulm.de, +49-731-50-23050