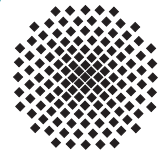


Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Intelligente Systeme
Max-Planck-Institut für Festkörperforschung
Fachbereich Physik, Universität Stuttgart

Ansprechpartner: Dr. Michael Hirscher
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Telefon: 0711 689-1808



Dienstag, 21. Januar 2020

16.00 Uhr c.t.

Hörsaal 2D5

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

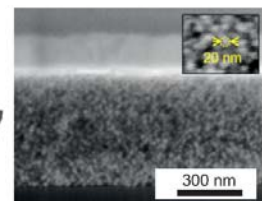
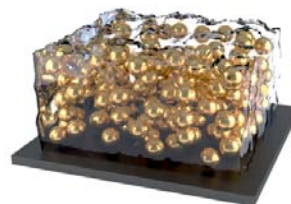
Gastgeber: Prof. Peer Fischer, Max-Planck-Institut für Intelligente Systeme, Telefon: 0711 689-3560

Actuating Nanostructures: Using light on the nanoscale

Jeremy J. Baumberg
University of Cambridge

Abstract

The ability to confine light in 1nm^3 volumes enables new functionalities for optoelectronic switching, sensing, and can generate optical forces sufficient to move individual atoms, molecules, and particles. I will show how we now create ultralow volume plasmonic cavities at the atom scale, and are routinely able to watch individual molecules and particles using nano-composites of plasmonic nanoparticles and thermos-responsive polymers. I will demonstrate the utility of the nN forces produced at sub- μs speeds, for creating novel active nanomachinery, utilizing the scaffolded DNA origami. High throughput synthesis allows the scale-up of these actuating nano-transducers (ANTs), opening up video-rate large area display technologies. Close-packed films of ANTs act to pump water in/out of permeable membranes using light, produce switchable metamaterials.



Using DNA origami we couple few dye molecules together optomechanically, and produce strong-light matter coupling that changes their quantum emission properties. We also watch redox chemistry in real time, watching single electrons shuttle in and out of single molecules, as well as 2D materials confined in the same gap. Prospective applications range from (bio)molecular sensing to fundamental science. I particularly focus on applications to nanomachinery actuation by light.