

MQ Photonics Seminar – 2 pm Wednesday 28 August

Title: Harvesting atomic forces for the optical manipulation of mesoscopic object.

Abstract: Optical tweezers usually rely on the interaction of light and the polarizability of the nanoparticle. Applying the powerful toolbox of atomic physics, we here want to exploit electronic resonances of optical centres embedded in solid-state matrix to enhance the optical forces [1]. We want to explore this effect in nanocrystals with a high concentration of active centers. It has been shown [2] that if the atoms are close enough to each other, they can act cooperatively, enhancing further the optical forces. We plan to investigate the dipole and scattering component of the resonant optical forces and their dependence on the density of centres. In particular we chose to study these effects on SiV nanodiamonds and rare-earth ions doped nanocrystals. These studies might help us understand collective effects in the solid-state and help us harvest a relatively new effect for quantum technologies of mesoscopic systems.

[1] M. L. Juan & al., Nat. Phys. 13, 241–245 (2017)

[2] B. Prasanna Venkatesh & al., Phys. Rev. Lett. 120, 033602 (2018)

Location: Multi-purpose room, 2.300 7WW



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