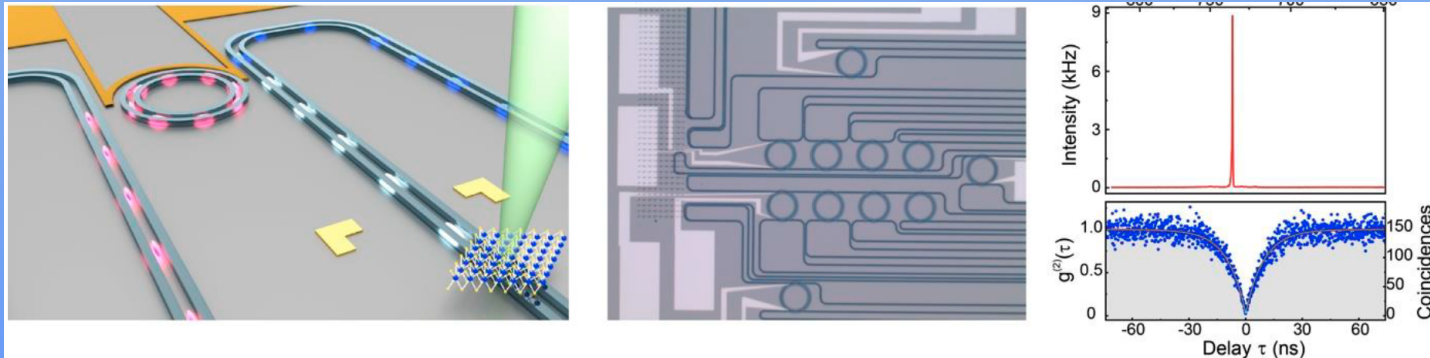


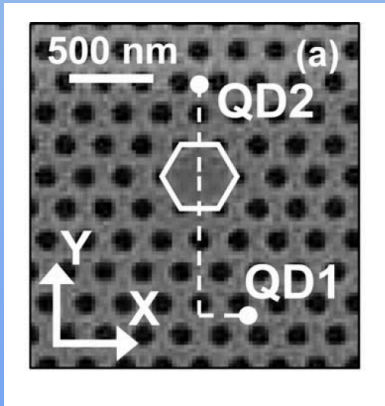
Nanophotonics as a Key for Future Quantum Technologies



Pablo Aitor Postigo

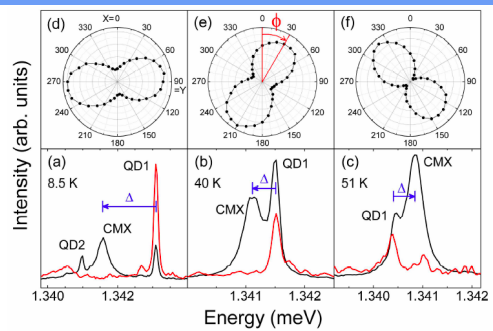
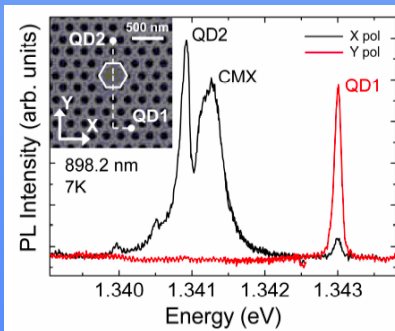
Grupo de Dispositivos Nanofotónicos (Nanopod) - IMN-CSIC
IMN–Instituto de Micro y Nanotecnología (CNM–CSIC)
Isaac Newton 8, PTM, E-28760 Tres Cantos, Madrid, Spain

Optical coupling of two distant InAs/GaAs quantum dots by a photonic-crystal microcavity

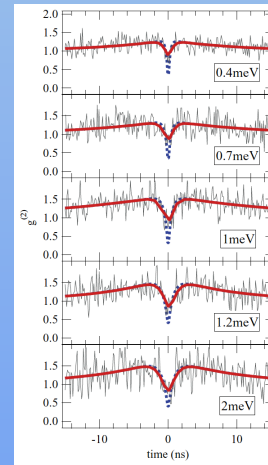


Long distance (1.4 μ m) interaction of two different InAs/GaAs quantum dots in a photonic crystal microcavity is observed at the single photon level.

Phys. Rev. B **81**, 193301 (2010)



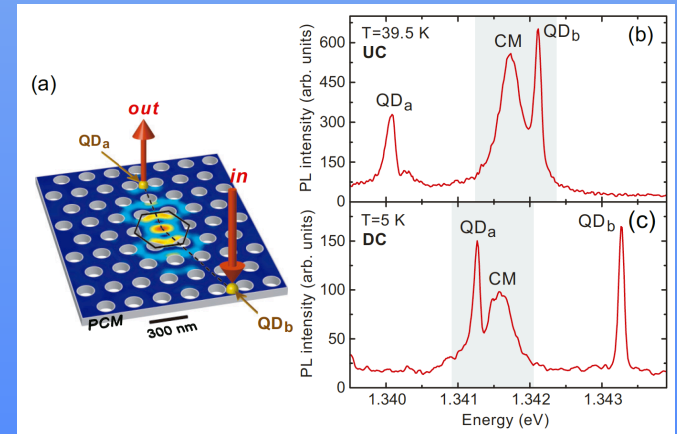
Controlling the properties of single photon emitters via the Purcell effect



A continuous decrease of the antibunching time is observed as the detuning is decreased at constant excitation rate, due to the detuning-dependent Purcell effect.

Bichromatic dressing of a quantum dot detected by a remote second quantum dot

Phys. Rev. B **86**, 085316 (2012)



Resonant excitation of any of the two QDs produces dressed states due to coherent coupling of the QD to the laser field. We show that the population of the dressed states of one of the QDs can be read out through the optical emission of the other QD.

E. Gallardo et al. Vol. 18, No. 12 / OPTICS EXPRESS 13301 (2010), E. Gallardo et al. Physica E (2010)

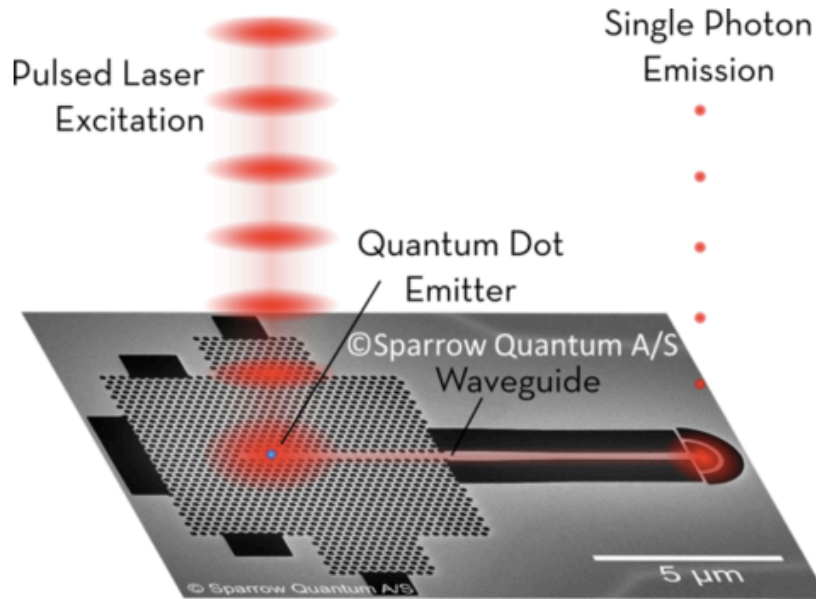
“Single photon emission by semiconductor quantum rings in a photonic crystal”. E. Gallardo et al. JOSA B 27, A21-A24 (2010).

On-demand single photon sources



PHOTONIC RESEARCH JUST

The powerful new SPARROW SINGLE-PHOTON CHIP delivers a steady stream

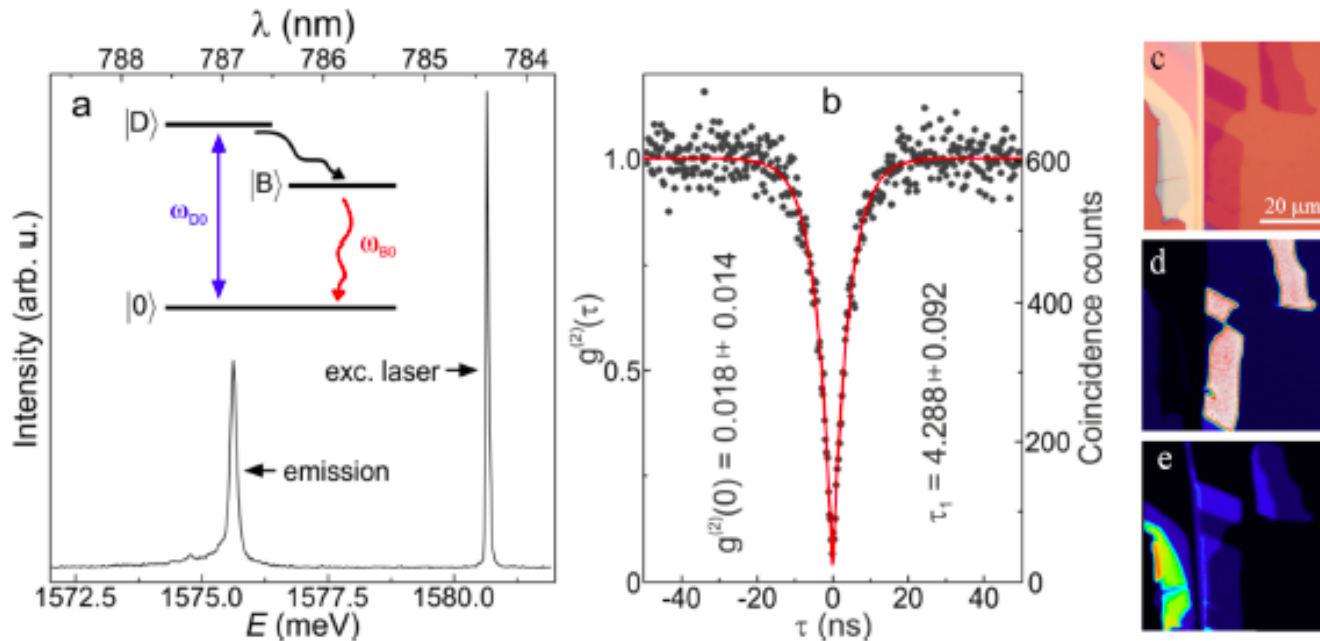


THE CHIP



- Use photonic resonator (DBR or Photonic Crystal)
- Use of Quantum Dots
- Cryogenic cooling
- Optical pumping

Quantum Photonics using 2D Materials



- 2D Materials instead quantum dots: advantages
- Single photons are produced by defects in the surface
- Room T! (hBN 1550 nm !)

