Open positions (PhD, Post-doc)

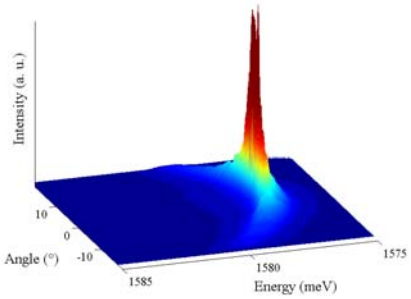
Bose condensate in semiconductor microcavities

A PhD and a post-doctoral European grant are now available at Laboratoire de Photonique et de Nanostructures, Marcoussis, France.

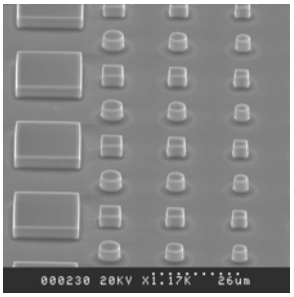
Scientific context:

A fascinating property of bosons is their ability to spontaneously accumulate in a single quantum state, below a certain critical temperature. This so-called Bose condensation is at the origin of superconductivity, superfluidity of liquid helium and has also been observed with ultra-cold atoms.

Recent studies have shown that semiconductor microcavities are a model solid-state system where Bose condensates can be obtained at temperatures as high as room temperatures. In these microcavities, the quasi-particules exhibiting bosonic behaviour are polaritons (quantum well excitons strongly coupled to the cavity optical mode). Beside their interest for fundamental studies, these polariton condensates could also provide low threshold sources of coherent light.



Our group has recently demonstrated polariton condensation in GaAs/GaAlAs based microcavities both in planar cavities and micropillars [1]. We are now able to completely control the confinement geometry and the quantum state in which condensation occurs. This opens unique possibilities for the development of innovative cavity geometries (single or coupled micropillars, photonic rings etc…) to investigate this new physics: superfluid propagation, behaviour under strong magnetic field or non-linear oscillations occurring when coupling two condensates.



This work will be done in collaboration with several theoretician groups, within the Clermont4 European network.

We welcome applications from excellent candidates showing strong skill in experimental works and good knowledge in quantum mechanics, optics and solid state physics.

[1] "Polariton laser using single micropillar GaAs-GaAlAs semiconductor cavities", D. Bajoni et al., Phys. Rev. Lett. 100, 047401 (2008); "Spontaneous formation of a polariton condensate in a planar GaAs microcavity", E. Wertz, et al., Appl. Phys. Lett. 95, 051108 (2009)

Experimental technics: Low temperature optical spectroscopy (cw and time resolved microphotoluminescence), technological process in a clean room environment.

Applications should be sent to:

Dr. Jacqueline Bloch
LPN/CNRS, Route de Nozay, 91460 Marcoussis, France
Jacqueline.bloch@lpn.cnrs.fr
Tel : (33) 1 69 63 61 90