

CEA - Saclay 91191 Gif-sur-yvette Cedex
Service de Physique de l'Etat Condensé
SÉMINAIRE

Mercredi 25 mai 11h15

Orme des Merisiers SPEC Salle Itzykson, Bât.774

**Propagation and optical manipulation of Bose condensates in
semiconductor microcavities**

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Cavity polaritons are mixed exciton-photon states arising from the strong coupling regime between excitons confined in quantum wells and photons confined in an optical microcavity. They are bosonic quasi-particles with a very small effective mass: they offer the possibility to investigate the physics of Bose condensates in a solid state system. Polariton condensates are out of equilibrium dynamical condensates, with weak interactions mediated by their excitonic part. They have a pseudo-spin which can be optically addressed. After a general introduction to cavity polaritons, I will describe recent experiments performed on one dimensional cavities. We have generated polariton condensates which can propagate over macroscopic distances while preserving their spatial coherence. We have shown that these condensates can be optically manipulated, coupled through a controlled tunnel barrier or trapped in a controlled way. Interactions play a key role in these experiments. These results open the way toward the realization of new optical circuits based on the propagation and manipulation of polariton condensates.

References :

“Spontaneous formation and optical manipulation of extended polariton condensates”, E. Wertz, L. Ferrier, D. Solnyshkov, R. Johne, D. Sanvitto, A. Lemaître, I. Sagnes, R. Grousson, A.V. Kavokin, P. Senellart, G. Malpuech and J. Bloch, *Nature Physics* 6, 860 (2010).

«Interactions in Confined Polariton Condensates », L. Ferrier, E. Wertz, R. Johne, D.D. Solnyshkov, P. Senellart, I. Sagnes, A. Lemaître, G. Malpuech, and J. Bloch, *Phys. Rev. Lett.* 106, 126401 (2011)

A coffee break will be served at 11h00. The seminar will be given in English.