



# GUEST LECTURES

**Cristiano Ciuti**

Université Paris Diderot

LV-NR: 387.059

## Quantum fluid properties of light and cavity quantum electrodynamics in solids

In these lectures, I will discuss theoretically some interesting physical properties of strongly interacting photons in nonlinear microcavities. After a preliminary introduction on equilibrium superfluids in matter systems (ultracold atoms and liquid helium), I will discuss the peculiar features of the recently observed non-equilibrium superfluidity of light in semiconductor microcavities (theory and experiments). Moreover, I will present some recent advances on the cavity quantum electrodynamics of solid-state systems (semiconductors and superconductors) in the unconventional ultrastrong coupling limit, showing how the quantum vacuum can be manipulated.

1st lecture: Tuesday, 20.04.2010 14:00 hrs SEM387

**IR-ON SEMINAR:** Friday, 23.04.2010 14:00 hrs SEM387

Quantum devices with a cavity-embedded two-dimensional electron gas  
(electrical injection into cavity polaritons and dressed electron transport; lasing without population inversion and stimulated scattering of intersubband cavity polaritons)

2nd lecture: Monday, 26.04.2010 17:00 hrs HS 7 Schütte-Lihotzky **CoQus SEMINAR**

3rd lecture: Thursday, 29.04.2010 14:00 hrs SEM387

Contact: [barbara.weber@tuwien.ac.at](mailto:barbara.weber@tuwien.ac.at)