

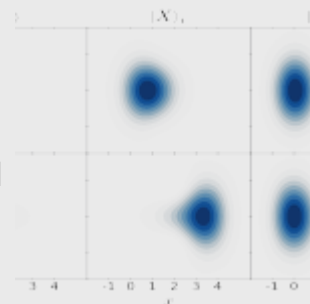
## Modelling Organic Condensates From Weak To Strong Coupling

Title: Modelling Organic Condensates From Weak To Strong Coupling.

When: Wednesday, January 25, (2017), 12:00.

Place: Departamento de Física de la Materia Condensada, Facultad Ciencias, Module 3, Seminar Room (5th Floor).

Speaker: Jonathan Keeling, SUPA - School of Physics and Astronomy, University of St Andrews, St Andrews KY16 9SS, United Kingdom.



The idea of studying strong matter-light coupling using organic molecules has a long history [1], but has recently seen an explosion of experimental interest [2]. In particular exciton-polariton lasing and condensation has now been observed in a variety of organic media, including anthracene, organic polymers, and fluorenes. Closely related to these strong coupling polariton condensates is the observation, in weak coupling, of Bose-Einstein condensation of photons in a dye-filled microcavity [3]. These experiments pose several questions about the relation of condensation and lasing, and about the role of vibrational modes in the physics of photon and polariton condensation. I will discuss our recent work on these subjects.

In the context of photon condensation, I will discuss the role of vibrational modes in establishing a thermal distribution of photons [4], including the time-evolution toward the thermal state. In the context of polariton condensation I will discuss our recent work exploring the nature of the ground and excited states of a model of such a system [5,6]. In particular, I will focus on the connections to optomechanics in other systems, and changes in the optical properties that can arise from coupling to vibrational modes.

### References

Agranovich, *The Theory of Excitons* (Nauka, 1410.6632. Moscow, 1968). *Excitations in Organic Solids*, (Oxford University Press, Oxford, 2009).

Kena-Cohen and Forrest, *Nat. Photon.* 4 371 (2010). Plumhof et al *Nat. Mater.* 13 247 (2014); Daskalakis et al, *ibid* 271.

Klaers et al, *Nature* 468 545 (2010).

Kirton and Keeling, *Phys. Rev. Lett.* 111, 100404 (2013), arXiv: 1410.6623.

Cwik et al, *Eur. Phys. Lett.* 105, 47009 (2014).

M. A. Zeb, P. G. Kirton, J. Keeling, arXiv:1608.08929.

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