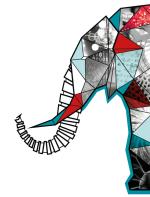


# 25<sup>e</sup> Congrès Général de la Société Française de Physique



ID de Contribution: 148

Type: Poster

## Turbulences in coherently driven polaritons superfluids

Exciton-polaritons, microcavity half-matter half-light quasi-particles, when resonantly driven exhibit a superfluid regime. Accordingly, topological excitations similar to those predicted in equilibrium superfluids may spontaneously appear [1,2]. However, the non-equilibrium nature of polaritons requires the system to be continuously pumped to compensate for losses. This driving plays a crucial role in the formation and dynamics of such topological excitations tending to inhibit their formation [1].

I will present a recent breakthrough allowing to simultaneously extended the fluid propagation distance and to release the constraints imposed by the resonant driving [3]. This fully optical method, exploiting optical bistability present in these systems, allows for accurate hydrodynamics study of polariton superfluid and for a deterministic control of excitation taking place in this unconventional fluid of light.

I will report the experimental validation of the proposal.

[1] S. Pigeon, I. Carusotto and C. Ciuti, *Phys. Rev. B*, **83**, 144513 (2010).

[2] A. Amo, S. Pigeon, D. Sanvitto, V. G. Sala, R. Hivet, I. Carusotto, F. Pisanello, G. Leménager, R. Houdré, E. Giacobino, C. Ciuti and A. Bramati, *Science* **332** 1167 (2011).

[3] S. Pigeon and A. Bramati, *New J. Phys.* **19** 095004 (2017).

### Choix de session parallèle

2.3 Fluides quantiques et lumière

**Auteurs principaux:** Dr PIGEON, Simon (Laboratoire Kastler Brossel); Mme MAITRE, Anne (Laboratoire Kastler Brossel); M. LERARIO, Giovanni (Laboratoire Kastler Brossel); Prof. GIACOBINO, Élisabeth (Laboratoire Kastler Brossel); Prof. GLORIEUX, Quentin (Laboratoire Kastler Brossel); Prof. BRAMATI, Alberto (Laboratoire Kastler Brossel)

**Orateur:** Dr PIGEON, Simon (Laboratoire Kastler Brossel)

**Classification de Session:** Séance Poster