

Contribution ID: 28

Type: **not specified**

Superfluids of Light in Nonlinear Optical Media

Thursday 9 February 2023 10:30 (15 minutes)

The first observation of a fluid-like light with characteristics similar to a superfluid was performed by M. Brambilla, who studied a coherent electromagnetic field in a laser cavity and reformulated the temporal evolution in terms of hydrodynamic equations similar to the Gross-Pitaevskii equation, initiating a new discussion about the relationship between hydrodynamic turbulence and optical turbulence. This work is based on another type of experiments, which also allows to observe similar phenomena, using systems where light waves propagate freely in the medium (without the need for confinement in cavities) in an “optically dense” medium. In warm alkaline vapours, photon-photon interactions are non-negligible and rule the dynamics of the system, causing light to behave like a fluid. Superfluidity can be observed in fluids of light by measuring the elementary excitations, its dispersion relation or by observing the formation of vortices near obstacles. Aiming to experimentally observe the formation of superfluids of light in these media, this project is part of the experiments conducted at MotLab part of the Laboratory for Quantum Plasmas at Instituto de Plasmas e Fusão Nuclear (IPFN) @ Técnico.

Author: Mr LAGOAS ROLDÃO, Miguel (IPFN)

Presenter: Mr LAGOAS ROLDÃO, Miguel (IPFN)