Postdoctoral Research Fellow Position (one-year)

Quantum Turbulence : Three-Fluid Modeling Phenomenology and Numerical Simulations

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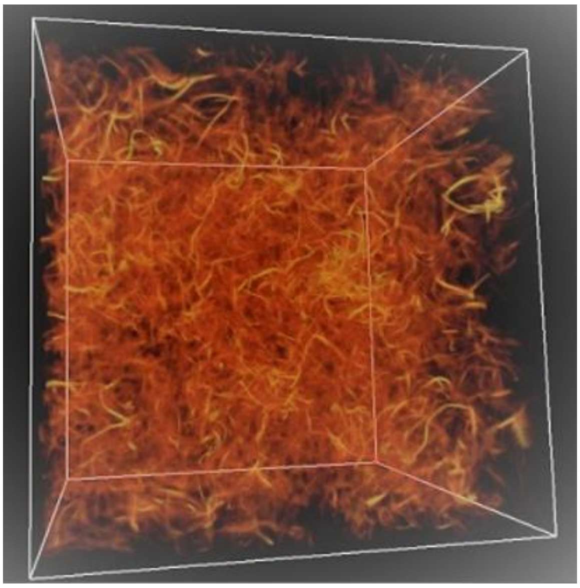
Quantum turbulence can be treated at a coarse-grained level as a problem of *classical fluid dynamics* by considering a mixture of two interacting fluids: a normal fluid with a non-zero viscosity and an inviscid superfluid. The dynamics then obeys a system of Navier-Stokes and Euler equations coupled by a mutual friction force modelling the interactions between the elementary vortices of the superfluid component and the normal fluid. This is the framework of the so-called *two-fluid model* initiated by Landau and Tisza in 1941. The present program aims at extending this framework by accounting explicitly for the coarse-grained dynamics of the superfluid elementary vortices, viewed as a *third-fluid component*.

The successful candidate will perform pseudo-spectral simulations of quantum turbulence encompassing three-fluid modelling by using an operational internal code (in Fortran). The results will be compared with recent experimental data and previous numerical results obtained with the two-fluid model. This study will contribute to improve our understanding of multiscale properties of quantum turbulence.



Quantum Turbulence simulation – coarse-grained vorticity of the superfluid component

This program is part of a major project called *Quantum Turbulence Exploration by High-Performance Computing* (QuteHPC) funded by the French National Research Agency (ANR). The successful candidate with therefore develop his research activity collaboratively with the other academic partners of the project: Institut Néel CNRS, ENS Paris, University of Poitiers and University of Rouen Normandy.

Qualifications:
Ph.D. in Engineering or Physics with prior experience and contributions in the area of fluid mechanics; numerical simulation of turbulent flows; turbulence phenomenology. Skills in quantum mechanics are not required.

Application:
a detailed CV with a cover letter
a summary of recent work and interests
one letter of reference

Contact:
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For additional information about our research project, visit http://qute-hpc.math.cnrs.fr/

Review of applications will begin immediately and continue until the position is filled.