

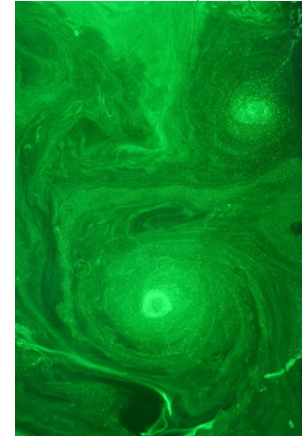


Post-doctoral position in numerical fluids mechanics
wave turbulence in geophysical flows
LEGI, Grenoble



European Research Council
Established by the European Commission

A postdoctoral position is available in LEGI (Laboratoire des Ecoulements Géophysiques et Industriels, Grenoble, France). The research program concerns the topic of wave turbulence in stratified flows in the framework of the ongoing ERC-funded project WATU (*Wave turbulence: beyond the Zakharov spectrum*) under the supervision of Nicolas Mordant. Wave Turbulence Theory was developed initially to describe the statistical properties of waves at the surface of the ocean but many other wave systems can sustain such turbulence. In addition to surface waves, WATU project investigates also geophysical flows with a special focus on stratified flows. Fluids with a stable vertical variation of density can sustain internal gravity waves. In oceans, this stratification results from variations of temperature and salinity. When the waves are nonlinear, they may evolve into a state of wave turbulence characterized by an energy flux in scale. In addition to waves, such fluids can also develop high Reynolds number turbulence made of vortices and which structure is affected by the anisotropy induced by the gravity. The presence of either sort of turbulence improves the mixing efficiency of the flow that in turn affects the stratification. These issues are of primary importance in the dynamics of the large scale oceanic circulation and the issue of energy and scalar dissipation in oceanography.



The post-doctoral associate will have to perform idealized numerical simulations (pseudo-spectral) of stratified and/or rotating turbulence inspired from experiments developed in the framework of the WATU project. Experiments are developed in the CORIOLIS facility (see picture) which is a unique device dedicated to the modeling of geophysical flows. The associate may occasionally contribute to the experiment. The scientific issue is to reveal the wave contribution into stratified turbulence by developing a space and time resolved analysis of the turbulent field. Simulations will be run on local and national clusters using the open-source pseudo-spectral code [FluidSim](#) (developed by Pierre Augier, among others, partner of the project). Some additional code developments will have to be done, in particular to implement on the fly outputs and a mechanism of «[phase shifting](#)».



The applicant must have developed skills in pseudo-spectral simulations and in statistical analysis of turbulent flows. He/She must be familiar with standard statistical data processing (Fourier spectra, correlations, PDF...). Skills in use of Python for the development of HPC open-source code would be highly appreciated.

The project is hosted on the Grenoble campus of Saint Martin d'Hères, on the premises of LEGI which is a fluid mechanics laboratory with very diverse research interests and with a strong experimental component. Applicants must contact Nicolas Mordant (nicolas.mordant@univ-grenoble-alpes.fr , ph: +33 (0)4 76 82 50 47) or Pierre Augier (pierre.augier@univ-grenoble-alpes.fr, 04 56 52 86 16)

for further information and application.

