

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

A 1-year postdoctoral position is available in LEGI (Laboratoire des Ecoulements Géophysiques et Industriels, Grenoble, France) under the supervision of Nicolas Mordant. The research program concerns the topic of wave turbulence in stratified flows in the framework of the ongoing Simons collaboration on wave turbulence funded by the Simons foundation in New York City (<https://cims.nyu.edu/wave-turbulence/>). 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. Our project investigates 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 develop experiments and advanced statistical analyses of turbulence forced by waves in stratified water (with or without rotation). Experiments are developed in the CORIOLIS facility (see picture) which is a unique device dedicated to the modeling of geophysical flows. It consists in a 13m diameter, 1m-deep rotating tank equipped with a specific hydraulic scheme to generate arbitrary salt stratification profiles. The scientific issue is to reveal the wave contribution into stratified turbulence by developing a space and time resolved analysis of the turbulent field.



The project being experimental, the applicant must have developed an expertise in experimental fluid dynamics with experience of the use of Particle Image Velocimetry and/or Particle Tracking Velocimetry. He/She must be familiar with standard statistical data processing (Fourier spectra, correlations, PDF...). Skills in Python programming are welcome.

The position should start as soon as possible. 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 , phone: +33 (0)4 76 82 50 47) for further information and application. <http://nicolas.mordant.free.fr>