



INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

INTERNSHIP SUBJECT FORM

Name of the Host Laboratory	Hydrodynamics Laboratory (LadHyX)
Website of the Host Laboratory	http://www.ladhyx.polytechnique.fr
Research Group	Environment
Internship Supervisor	Ernesto Horne and Paul Billant
Internship Subject	EXPERIMENTAL STUDY OF STRATIFIED AND ROTATING TURBULENT FLOWS
Student's level	<input type="checkbox"/> Advanced Undergraduate Students (3 rd or 4 th year) <input checked="" type="checkbox"/> Master's students (1 st or 2 nd year) <input type="checkbox"/> PhD students
Proposed Duration	<input type="checkbox"/> 3 months <input checked="" type="checkbox"/> 4 months <input checked="" type="checkbox"/> 5 months <input checked="" type="checkbox"/> 6 months
Prerequisites	
Internship description (max. 15 lines)	<p>Turbulence in the oceans and atmosphere is dominated by stratification and rotation. Understanding how the energy is transported from large eddies to the small dissipative scales would improve the modeling of the unresolved scales in meteorological and oceanic models. The combination of stratification and rotation produces a particular type of turbulence, with a dual cascade of energy towards the large scales and small scales where the energy is dissipated [1,2]. The eddies are increasingly large but with a small thickness. In this internship, we will use an experimental setup consisting in a large tank filled with salty stratified water and mounted over a rotating table. The turbulence will be generated thanks to multiple flaps producing columnar vortices that interact between each other [3]. Particle image velocimetry will be used in order to measure the velocity field. The goal of the internship is to measure the transport of energy towards small and large scales depending on the magnitudes of the rotation and stratification. Experimental results will be compared with numerical simulations done in parallel.</p> <p>[1] Deusebio et al., J. Fluid Mech, 720, 66 (2013) [2] Pouquet et al., Physics of Fluids, 29, 111108 (2017) [3] Augier et al., J. Fluid Mech, 769, 403 (2015)</p>