# Transitions in stratified shear flows

**Positions:** PhD, Master internships **Location**: ENSTA-Paris, Institut Polytechnique de Paris, Palaiseau, France **Contact**: romain.monchaux@ensta-paris.fr

## **Motivations:**

Stratification is ubiquitous in geophysical flows in the ocean or in the atmosphere but also in many other astronomic situations in stars, planets or during planet formation. Stability of sheared flows is also a central point in fluid mechanics since it governs the behavior of pipe flows and boundary layers which are of prime importance both on industrial and on fundamental points of view. We recently identified an unexpected transition in stratified plane Couette flow. This PhD proposes to understand its very nature.

## Local context:

Our group has a longstanding experience in the study of Couette flow for which we have designed one of the only running setup in the world. This experiment is instrumented with a high spatial resolution time resolved Particle Image Velocimetry system which allows us to resolve all scales of the flow even in our large dimensional setup. Collaborations with IRPHE (Marseille, France) and LISN (Orsay, France) are developed to perform simultaneously numerical simulations, theoretical developments or complementary experiments.

## **Open positions:**

PhD and master internship positions are open to study both the role of Reynolds number and Froude number on the nature of the stratified Couette flow. We propose experimental works in large scale shear flows where we perform time and space resolved Eulerian measurements. Very few teams in the world are able to do so which puts us in an interesting position to tackle this issue experimentally. Collaborations will be used to add theoretical and/or numerical aspects to the PhD.

Possibilty of teaching in top ranking French "Grande Ecole".

### Application:

Highly motivated candidate wishing to gain strong background in experimental fluid mechanics are welcome.

CV (2 pages max), motivation letter (1 page), BSc/MSc transcripts and three names for references to be sent to romain.monchaux@ensta-paris.fr

