

Institut de Mécanique des Fluides

Amphithéâtre Nougaro (Entrée A) - 2 Allée du Pr Camille Soula, Toulouse

Mercredi 19 Avril - 10 h 00

Yohann DUGUET

LIMSI/CNRS

Intermittent turbulent structures in wall-bounded shear flows

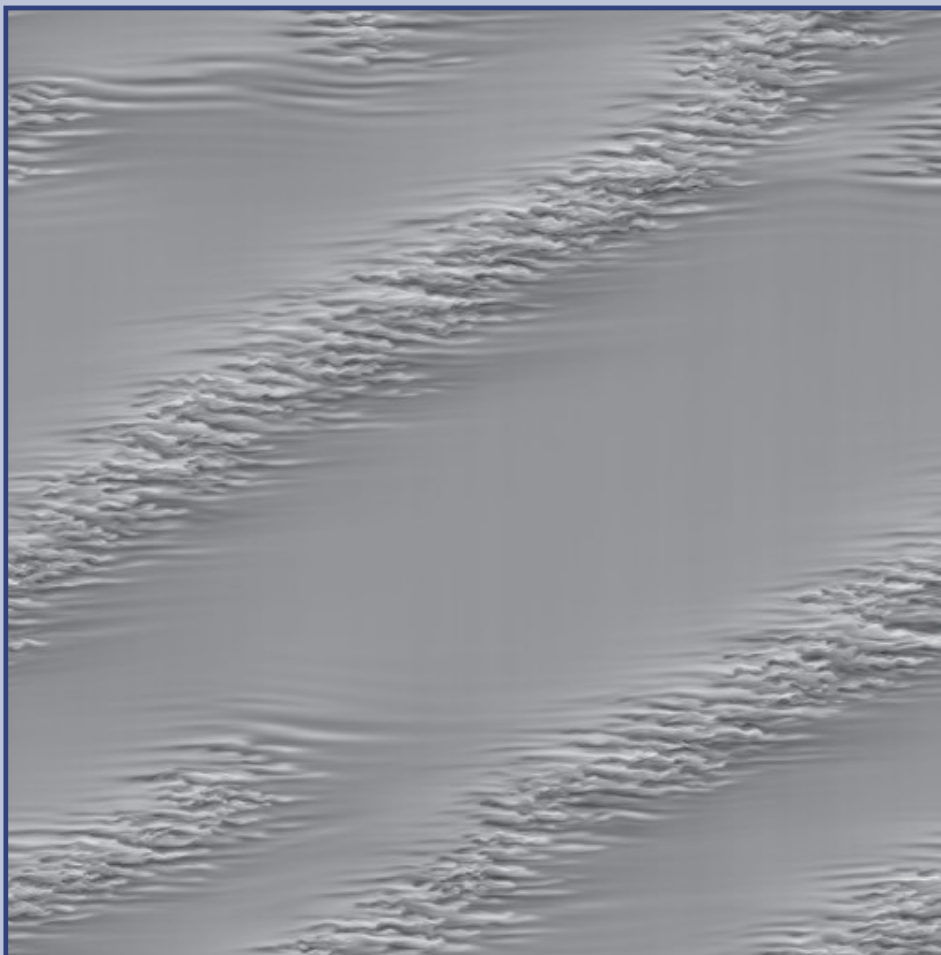


Figure : Relaminarising oblique laminar/turbulent stripes in a plane Couette flow
(Direct Numerical Simulation using a spectral method, iso-streamwise velocity at mid-gap)

The problem of transition to turbulence has continued to puzzle hydrodynamicists, mathematicians and engineers for more than a century. Circular and annular pipes, plane channels as well as some simple boundary layer flows are characterised by a turbulent regime in competition with a linearly stable laminar base flow. The associated hysteresis has a strong impact on the energetic performances.

In this talk I will review the most recent developments on transition to turbulence in a variety of wall-bounded shear flows, based on experimental, theoretical and numerical evidence.

At the lowest values of the Reynolds number where it can be observed, turbulence spontaneously takes the form of localised patches and sometimes genuine laminar/turbulent patterns. The structure and the dynamics at the laminar/turbulent interfaces depend however on the flow geometry. By comparing several flow cases, I will explain how this surprising self-organisation is determined by large-scale flows generated at these interfaces.

contact : sig_communication@imft.fr