

Influence of confining walls onto secondary vortex pairing

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A fluid submitted to a velocity shear is in general unstable and tends to form a line of discrete vortices which is itself unstable and evolves through vortex pairing events. The influence of confining walls on the development of the shear instability has recently received a lot of attention, as a consequence of its role in the optimization of mixing efficiency in injectors. The secondary pairing instability however also crucially contributes to the transition to turbulence.

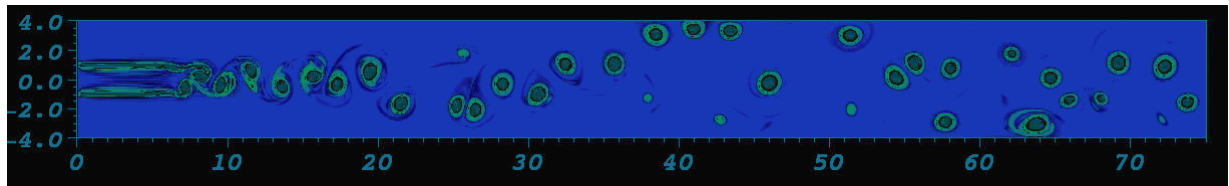


Fig. 1 Instantaneous vorticity modulus field in a confined Von Karman Street (Biancofiore et al. 2011)

The objective of this project is to analyse the influence of confining walls on the development of the secondary instability of an alley of point vortices. A combination of theoretical and numerical approaches will be used to determine if the presence of walls is a stabilizing or a destabilizing factor.

References:

Biancofiore, L., Pasquetti, R.. & Gallaire, F., Influence of confinement on obstacle-free turbulent wakes, *Comp. Fluids*, in revision, 2011.