Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Kelvin-Helmholtz instability in a confined geometry PAUL BONIFACE, MSC Laboratory - University Paris 7 Diderot and Saint-Gobain Recherche, LUC LEBON, MATHIEU RECEVEUR, MSC Laboratory - University Paris 7 Diderot, FABIEN BOUILLET, Saint-Gobain Recherche, LAURENT LIMAT, MSC Laboratory - University Paris 7 Diderot — Growth of kelvin-Helmholtz instabilities received many attention in the case of wakes or shear layers with thickness increasing in the downstream direction. In contrast with these "unstationary" situations, few works investigate stationary situations in which a Kelvin Helmholtz raw grows and saturates inside an imposed geometry. One of the sole exception is an experiment developed by M. Rabaud & Y. Couder where vortices develop between concentric rotating disks. We developed an experiment in a different geometry: a recirculating belt is running at the free surface of a long rectangular tank of larger width. In some conditions a regular rectilinear raw of vortices develop between the flow dragged by the belt and the flow recirculating beside the belt. When the belt is on the central axis of the tank, with free surface on each side, recirculation flows on each side. In this case two regular raws can develop. Vortices of these two raws can interact and a 180° phase shift between them is observed. Properties of these vortices have been investigated and we tried to relate it to available models. Parallels with jet instability can be made. We also have explored the occurrence condition of the recirculation: at low reynolds number it can occur via the bottom of the tank.

Laurent Limat
MSC Laboratory - University Paris 7 Diderot

Date submitted: 01 Aug 2012 Electronic form version 1.4