Abstract Submitted for the DFD12 Meeting of The American Physical Society

Experimental investigation of flow instabilities behind a cube LUKASZ KLOTZ¹, Warsaw University of Technology, Warsaw - Poland, SOPHIE GOUJON-DURAND, JOSÉ EDUARDO WESFREID, PMMH (ESPCI-CNRS) Paris, France — The wake behind a cube has been experimentally investigated in a water tunnel using LIF visualization and PIV method. Measurements were carried out for a moderate Reynolds numbers, ranging up to 400. The basic flow shows four pairs of trailing vortex. Subsequent regimes were detected, with regular and instationnary instabilities. Values of onsets of instability have been determined and the nonlinear evolution of the perturbations, discussed in the framework of Landau models. The streamwise vorticity, obtained from PIV measurements, has been decomposed into azimuthally Fourier modes. The obtained bifurcation branches show symmetry breaking, corresponding to each regime obtained. The experimental results we present are in good agreement with a previous numerical simulation. The observed sequence of transitions, for flow instabilities behind a cube, are compared with those reported for flow behind a sphere and disks.

¹also at PMMH (ESPCI-CNRS) Paris, France

José Wesfreid PMMH (ESPCI-CNRS) Paris, France

Date submitted: 13 Aug 2012

Electronic form version 1.4