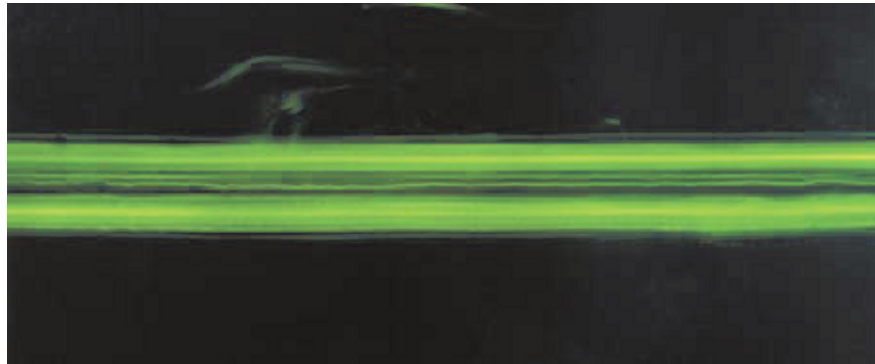# 1. Three-dimensional instabilities in a counterrotating vortex pair
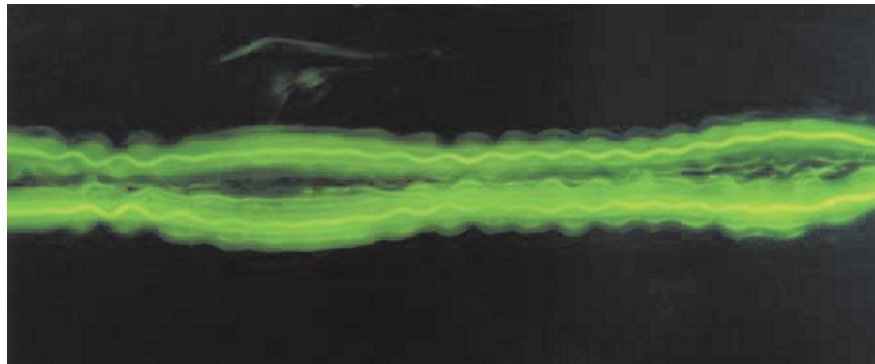
Leweke, T.[1] and Williamson, C. H. K.[2]
1) *IRPHE, CNRS/Universites Aix-Marseille, 12 av. General Leclerc, F-13003 Marseille, France*
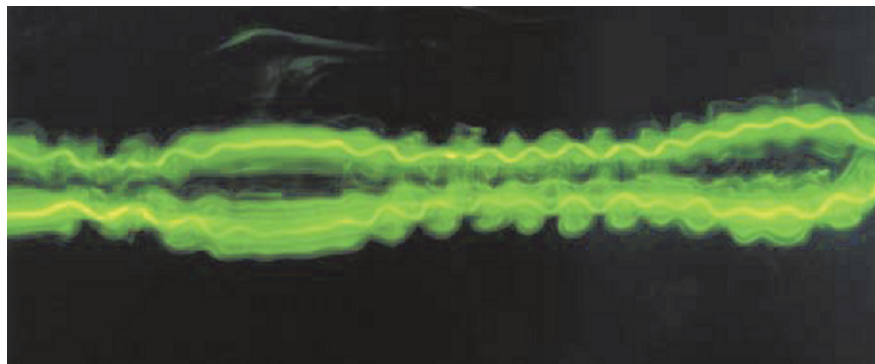2) *Mechanical & Aerospace Engineering, Cornell University, Ithaca, NY 14853-7501, USA*

(a)

(b)

(c)

These photographs show visualizations of the simultaneous development of two distinct instabilities in a counterrotating vortex pair at a Reynolds number, based on circulation, of 2750. The evolution of the pair, which is initially straight and parallel (a), is visualized using fluorescent dye and flood illumination with the light from an Argon laser. (b) clearly shows a large-scale symmetric deformation (the well-known Crow instability), as well as an anti-symmetric short-wavelength instability. In (c), the ordered perturbation starts to break up, leading to a rapid destruction of the vortex pair at later times. The short-wave perturbation is due to a so-called elliptic instability of the vortex cores, which is here observed clearly for the first time in an open flow.

Leweke, T., Williamson, C. H. K.; "Cooperalive clliptic instabillity of a vortex pair". J. Fluid Mcch., vol. 360, pp. 85-119 (1998).