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Kelvin-Helmhotz instability and Bénard-Von Karman vortex street in a confined geometry LUC LEBON, PAUL BONIFACE, MATHIEU RECEVEUR, LAURENT LIMAT, CNRS / Univ. Paris 7 — We have experimentally investigated the appearance of Kelvin-Helmhotz vortices in a confined geometry: in a closed rectangular tank a tape is pulled at high speed on the water surface. This induces a flow in the same direction as the tape, and by conservation a backward flow in the opposite direction. With an appropriate choose of the experiment parameters (water height, tape speed) the backward flow takes place on the sides of the tank: this creates a strong shear that can induces a Kelvin-Helmhotz instability on each side of the tank. As long as the tape width stays small enough compared to the tank width, we can observe the appearance of well organized vortex rows on each sides of the tank. In this case, the vortex rows are coupled like a Bénard-Von Karman vortex street, but without the classical forcing of a wake behind an obstacle. All our experiments are in agreement with a theoretical prediction by Rosenhead which extended the Bénard-Von Karman vortex street stability calculation to a confined geometry. Our work seems to be one of the first experimental verification of this 80 years old model.

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