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**Scaling Law for the Onset of Turbulence in Channel Flow**

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PMMH (ESPCI-CNRS) Paris, France — We are presenting experiments about the onset of turbulence in channel flow. We perturbed the base plane Poiseuille flow with continuous injection of water normally to the flow. We performed Particle Image Velocimetry experiments to measure the mean velocity profile with respect to the Reynolds number,  $Re$  and the amplitude of the perturbation  $u_{jet}/u_{cl}$ . Due to the unstable nature of the flow with respect to finite amplitude perturbation, it should exist a minimal amplitude  $\varepsilon$ , which trigger the transition to the turbulence. In order to find this critical value, we define a new experimental criterion using the value of  $\tilde{u} = \bar{u}_{cl}/\bar{u}_{cl,unperturbed}$ , giving the deformation of the mean velocity profile. We found a power law for the onset of turbulence  $\varepsilon = O(Re^{-3/2})$  and compared it with different models and previous experiments.

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