

Abstract Submitted  
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**Determining the universality class of the transition to turbulence**

GRÉGOIRE LEMOULT, BJÖRN HOF, IST Austria — In the counter-rotating regime of Taylor-Couette (TC) flow, turbulence appears abruptly through spatio-temporal intermittency (STI). STI is observed during the sub-critical transition to turbulence in many wall bounded shear flows, most notably pipe flow and Couette flows. K. Avila *et al.* (Science 333, 192-196 (2011)) recently characterized the onset of sustained turbulence in pipe flow and suggested that the transition could be a second order non-equilibrium phase transition. We explore this proposition in a TC experiment. Our TC set-up has an aspect ratio of 8 and an azimuthal length of more than 1300 gap-widths, minimizing the finite size effects and keeping the spatio-temporal dynamics 1D. We measured three independent critical exponents and they are in very good agreement with those of the directed percolation universality class in 1+1 dimensions. These experimental results strongly suggest that the transition to turbulence is a second order non-equilibrium phase transition.

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