Subcritical transition to turbulence in wall-bounded flows: the case of plane Poiseuille flow

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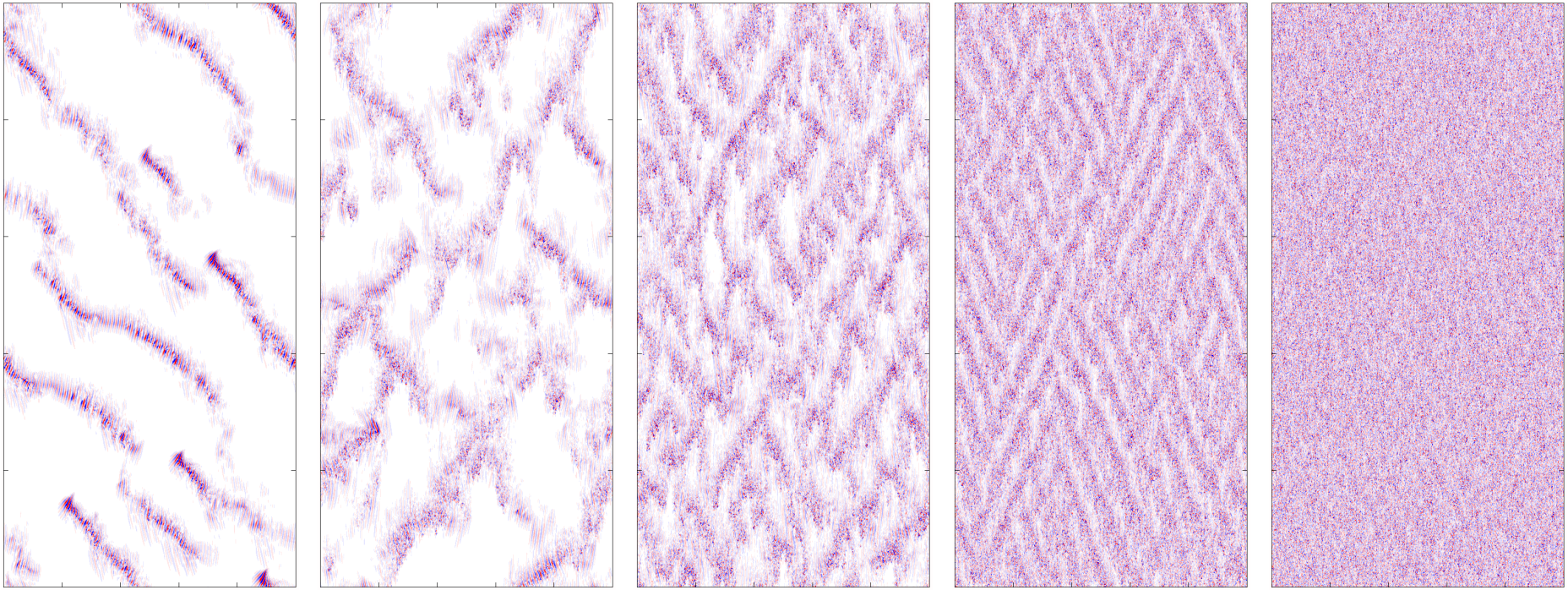
plane Poiseuille flow driven by a pressure gradient

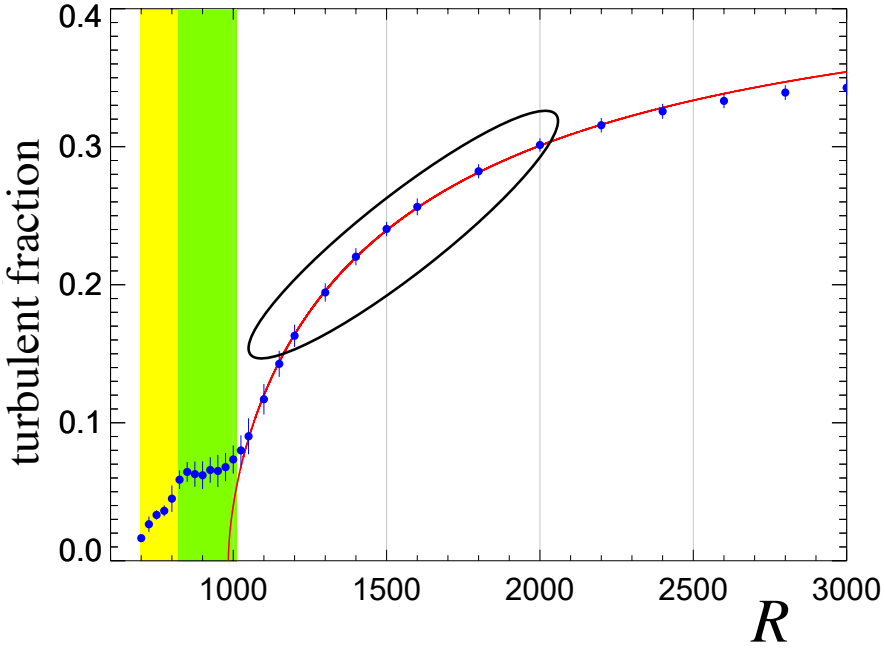
– numerical simulations, program by M.S. (NIFS's FUJITSU FX100 "Plasma Simulator")
– wide domain $500 \times 2 \times 250$ (also $1000 \times 2 \times 500$ and $250 \times 2 \times 125$)
– long durations, statistical steady state

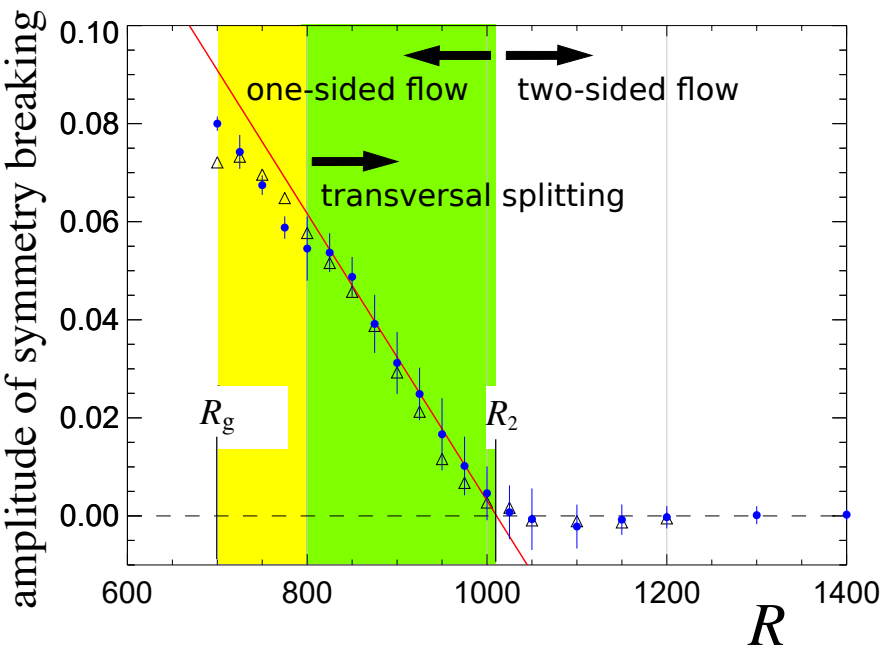


$R = 850$ $R = 1200$ $R = 1800$ $R = 3000$ $R = 4000$

global stability for $R < R_g \approx 700$ transitional regime with laminar-turbulent texture for $R \lesssim R_t \approx 4000$; essentially "featureless" for $R_t < R$

- decay at $R_g \rightsquigarrow$ directed percolation (Sano &Tamai, 2016) ??? $\rightsquigarrow$ truncated scenario





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- transition at $R_t \rightsquigarrow$ emergence of pattern at decreasing $R \Rightarrow$ Fourier analysis (preliminary, $\exists R_t$?)