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**Edge states intermediate between laminar and turbulent dynamics in pipe flow.** (English)

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Summary: We studied the dynamics near the boundary between laminar and turbulent dynamics in pipe flow. This boundary contains invariant dynamical states that are attracting when the dynamics is confined to the boundary. These states can be found by controlling a single quantity, in our case the energy content. The edge state is dominated by two downstream vortices and shows intrinsic chaotic dynamics. With increasing Reynolds number the separation between the edge state and turbulence increases. We can track it down to  $Re = 1900$ , where the turbulent lifetimes are short enough that spontaneous decay can also be seen in experiments.

**MSC:**

76F06 Transition to turbulence

76D05 Navier-Stokes equations for incompressible viscous fluids

Cited in 12 Documents

**Keywords:**

turbulence transition; pipe flow; coherent states

**Full Text:** [DOI](#)

**References:**

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