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Eliminating turbulence in spatially intermittent flows BJOERN HOF, ALBERTO DE LOZAR, MARC AVILA, Max-Planck-Institute for Dynamics and Self-Organization, TOBIAS SCHNEIDER, Harvard University — When transferring large quantities of fluid it is energetically far more efficient if the fluid motion is laminar since here friction losses are low. Flows through pipes and channels however are sensitive to minute disturbances even at moderate velocities and in practice most flows are turbulent. We here isolate an amplification mechanism which constantly feeds energy from the mean shear into turbulent eddies. In pipe and channel experiments a simple control strategy is applied to intercept this energy transport at intermediate flow-rates . When activated an immediate collapse of turbulence is observed and the flow re-laminarises. While in experiments this simple method is limited to moderate Reynolds numbers, numerical simulations show that the same principle works at much larger Re. Possible extensions to experiments at higher flow rates are discussed.

Bjoern Hof
Max-Planck-Institute for Dynamics and Self-Organization

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