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An experimental investigation of the relaminarization of pipe flow
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The appearance of turbulence in a pipe as the flow rate is increased is an unresolved problem, although new and interesting ideas continue to emerge. Theoretical investigations of the stability of the Hagen-Poiseuille indicate that the flow is linearly stable i.e. any infinitesimal perturbation introduced into the flow will decay. In practice, disordered flow can be self-sustained at Reynolds number above ~ 2000. We present the results of experiments on the decay of turbulence below the threshold in a constant-mass-flux pipe. The study of this reverse transition (i.e. the change from turbulent to laminar flow) allows us to uncover consistent lifetime distributions for disordered motion. We also find evidence for coherent wave like structures which suggest connections with modern theoretical developments.

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