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Relaminarisation of localised turbulence in pipe flow ASHLEY WILLIS, RICH KERSWELL, University of Bristol — The transition to turbulence in pipe flow is a longstanding problem of classical fluid mechanics. The basic laminar state is believed always to be linearly stable, however, finite amplitude disturbances lead to localised turbulent 'puffs' clearly seen in experiments. Recent experimental work (Peixinho & Mullin, 2006) has indicated that these puffs can become sustained in time, rather than suddenly decaying, beyond a threshold Reynolds number of 1750 ± 10. Their median survival times were found to scale with $(Re_c - Re)^{-1}$. Other experimental results for Re_c vary upward to 2000 (Wygnanski & Champagne, 1973) and recently (Hof *et al.*, 2006) no critical Reynolds number was found with median times increasing exponentially. Given the range of results, we investigate the transition through direct numerical simulation and consider the implications for the threshold to sustained turbulence.

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