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**Localized impulsive perturbations in pipe flow transition.** FERNANDO MELLIBOVSKY, ALVARO MESEGUER, Applied Physics Dept, Universitat Politecnica de Catalunya, FLUID MECHANICS TEAM — A numerical study of the destabilizing effects of localized impulsive perturbations in pressure-driven pipe flow is presented. The numerics intend to ellucidate the intrinsic mechanisms of subcritical transition to turbulence in pipe flow by reproducing recent experimental explorations carried out by Hof, Juel and Mullin (Phys. Rev. Lett. **91(24)**, 244502-4, 2003), concluding that the minimum amplitude of a perturbation required to cause transition scales as the inverse of the Reynolds number, i.e., $\mathcal{O}(\mathrm{Re}^{-1})$. A comprehensive exploration of the critical amplitudes that trigger transition as a function of the injection duration is carried out, concluding that injections lasting longer than 24 advective time units do not remarkably decrease the critical amplitude of transition. The critical threshold is then tracked for long enough injections and up to $\mathrm{Re} = 14000$ with reasonably good agreement for $\mathrm{Re} > 4000$. The apparent disagreement at low Re is explained in terms of the differences between constant mass-flux and pressure-driven pipe flows. finally, relaminarizing puffs at very low Re are analysed in search for coherent structures (travelling waves). Traces of these structures, numerically found, have been experimentally observed recently.

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