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**Studying the formation of non-linear bursts in fully turbulent channel flows**[1] MIGUEL P. ENCINAR, JAVIER JIMENEZ, Universidad Politecnica de Madrid — Linear transient growth has been suggested as a possible explanation for the intermittent behaviour, or 'bursting', in shear flows with a stable mean velocity profile. Analysing fully non-linear DNS databases yields a similar Orr+lift-up mechanism, but acting on spatially localised wave packets rather than on monochromatic infinite wavetrains. The Orr mechanism requires the presence of backwards-leaning wall-normal velocity perturbations as initial condition, but the linear theory fails to clarify how these perturbations are formed. We investigate the latter in a time-resolved wavelet-filtered turbulent channel database, which allows us to assign an amplitude and an inclination angle to a flow region of selected size. This yields regions that match the dynamics of linear Orr for short times. We find that a short streamwise velocity ($u$) perturbation (i.e. a streak meander) consistently appears before the burst, but disappears before the burst reaches its maximum amplitude. Lift-up then generates a longer streamwise velocity perturbation. The initial streamwise velocity is also found to be backwards-leaning, contrary to the averaged energy-containing scales, which are known to be tilted forward.

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