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Localised burst reconstruction from space-time PODs in a turbulent channel[1] ADRIAN GARCIA-GUTIERREZ, JAVIER JIMENEZ, UPM — The traditional proper orthogonal decomposition of the turbulent velocity fluctuations in a channel is extended to time under the assumption that the attractor is statistically stationary and can be treated as periodic for long-enough times. The objective is to extract space- and time-localised eddies that optimally represent the kinetic energy (and two-event correlation) of the flow. Using time-resolved data of a small-box simulation at $Re_\tau = 1880$, minimal for $y/h \approx 0.25$, PODs are computed from the two-point spectral-density tensor $\Phi(k_x, k_z, y, y', \omega)$. They are Fourier components in x, z and time, and depend on y and on the temporal frequency ω, or, equivalently, on the convection velocity $c = \omega/k_x$. Although the latter depends on y, a spatially and temporally localised 'burst' can be synthesised by adding a range of PODs with specific phases (Moin Moser, JFM 1989). The results are localised bursts that are amplified and tilted, in a time-periodic version of Orr-like behaviour.

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