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The effect of aspect ratio on statistically-stationary homogeneous shear flow[1] SIWEI DONG, ATSUSHI SEKIMOTO, JAVIER JIMÉNEZ, Universidad Politécnica de Madrid — The effect of the aspect ratio of the numerical domain is investigated in homogeneous shear turbulence at moderate Re_λ = 40-100, over long times for which its length scales are constrained by the numerics. For $L_y/L_z > 1$, the cross-shear box size, L_y, has a negligible influence on the statistics. For $A = L_x/L_z \leq 2$, the flow contains a relatively steady streamwise-velocity (u) streak, and the r.m.s. u' dominates the energy. For $A \geq 2$, the integral length is proportional to the spanwise box size L_z and the r.m.s. velocities are proportional to SL_z. That regime is dominated by strong bursting. In $2 < A < 4$, the bursting is due to the quasi-periodic breakdown of the streaks, which results in the intermittent formation of strong quasi-streamwise vortices. In that range, parameters such as the dimensionless shear Sq^2/ϵ, and the bursting period $ST \approx$ 10-15 are of the same order as in the logarithmic layer of wall turbulence. For $A \gg 4$, the cross-shear velocity v bursts most strongly, and the streak is weaker. That regime is quasi-two-dimensional in the (x, y) plane.

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Siwei Dong
Universidad Politécnica de Madrid

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