

# Movie Captions

- Movie 1

Supplementary Movie 1. Turbulent flow (left) in HKW domain and its symmetry reduction (right). Shown here are the isosurfaces of streamwise velocity (red/blue:  $u = 0.5 \max/\min u$ ) and streamwise vorticity (green/purple:  $\omega_x = 0.5 \max/\min \omega_x$ ).

- Movie 2

Supplementary Movie 2. Turbulent flow (left) in P2K domain and its symmetry reduction (right). Shown here are the isosurfaces of streamwise velocity (red/blue:  $u = 0.5 \max/\min u$ ) and streamwise vorticity (green/purple:  $\omega_x = 0.5 \max/\min \omega_x$ ).

- Movie 3

Supplementary Movie 3. Relative periodic orbit  $RPO_{79.4}$  (left) of the plane-Couette flow (HKW domain) and its symmetry reduction (right). Shown here are the isosurfaces of streamwise velocity (red/blue:  $u = 0.5 \max/\min u$ ) and streamwise vorticity (green/purple:  $\omega_x = 0.5 \max/\min \omega_x$ ).

- Movie 4

Supplementary Movie 4. Symmetry-reduced flow (left), its SRDMD approximation (middle), and state space projection (right) showing the spiral-out episode in P2K domain (Fig. 6b and 7 of the main text). Shown here are the isosurfaces of streamwise velocity (red/blue:  $u = 0.5 \max/\min u$ ) and streamwise vorticity (green/purple:  $\omega_x = 0.5 \max/\min \omega_x$ ).