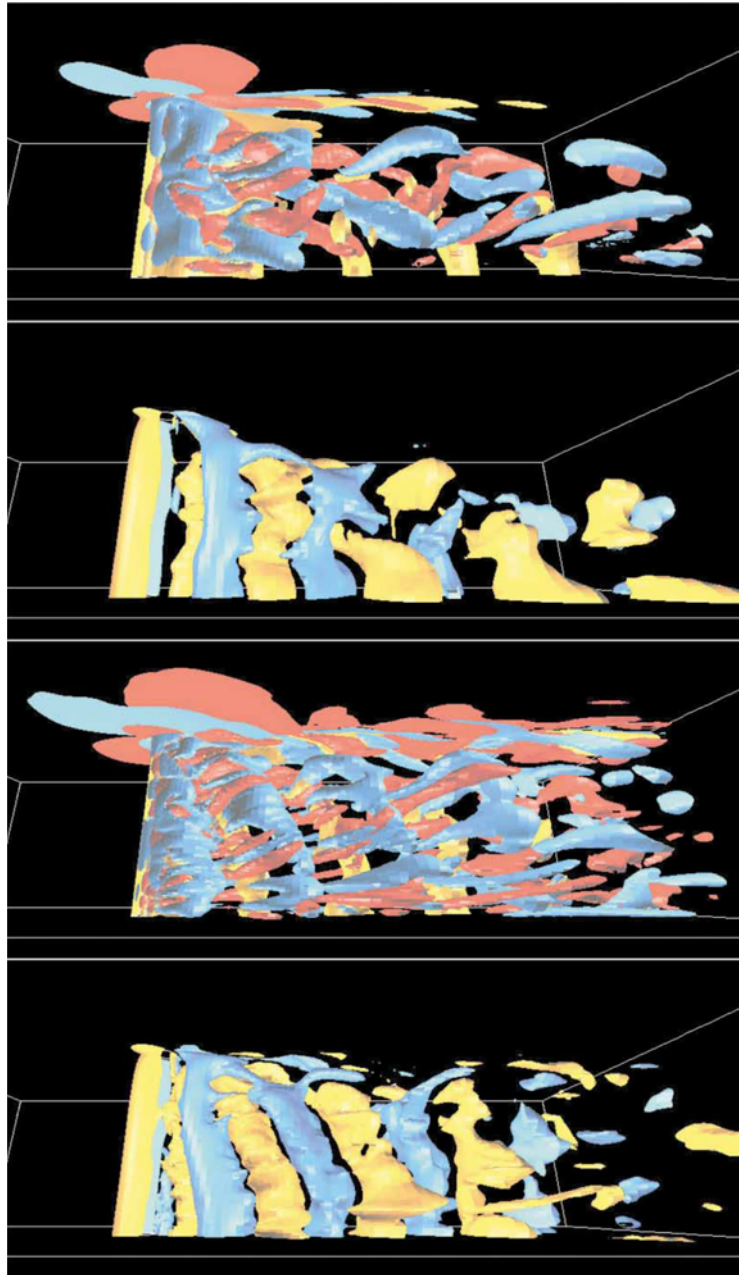


4. 3D Flows Past Circular Cylinder of Low Aspect Ratio

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Flows past finite cylinders of low aspect ratio (length to diameter ratio=16) are studied using finite element simulations. The end-conditions are specified to model the effect of a "no-slip" wall. Only one half of the spanwise length is considered. At $Re=300$ Mode A and Mode B patterns of vortex shedding in addition to vortex dislocations are observed at different time instants. The wake transition regime, which is known to occur in the Re range 190-250 for large aspect-ratio cylinders, is either extended and/or delayed for a cylinder of small aspect ratio with "no-slip" walls. At $Re=1000$ Mode B is observed along with vortex dislocations. The "no-slip" walls result in oblique mode of vortex shedding.

The top two frames are for $Re=300$ while the lower ones for $Re=1000$ flow. The first and third frames show the isosurfaces of the streamwise (ω_x) and spanwise (ω_z) vorticity field [red: $\omega_x=0.2$, blue: $\omega_x=-0.2$, yellow: $\omega_z=0.3$]. The second and fourth frames show the isosurfaces of the crossflow component of velocity field [blue: $v=-0.2$, yellow: $v=0.2$].