

## Visualization of Flows in the Gap between Concentric Cylinders

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Visualization of flows produced in a concentric cylinders system is made with Kalliroscope. When the system is closed (Fig. 1) and the inner cylinder rotating, the natural transition observed from the basic Couette flow to turbulent flow is as reported on the photographic sequence of Fig. 3: Taylor vortex flow → wavy vortex flow → modulated wavy vortex flow → weak turbulence. When the system is azimuthally opened (Fig. 2), and both cylinders are at rest, the main transitional sequence of the Dean flow subsequent to a basic Poiseuille flow is reported on Fig. 4; when the basic flow is a combination of Couette and Poiseuille flows, observations made at the inlet, the core and the outlet of the subsequent Taylor-Dean flow, show (Fig. 5) that different flow patterns develop themselves simultaneously.

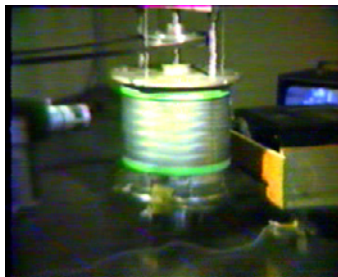


Fig. 1. Closed Taylor-Couette system.

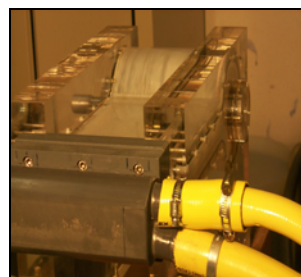


Fig. 2. Open Taylor-Dean system.

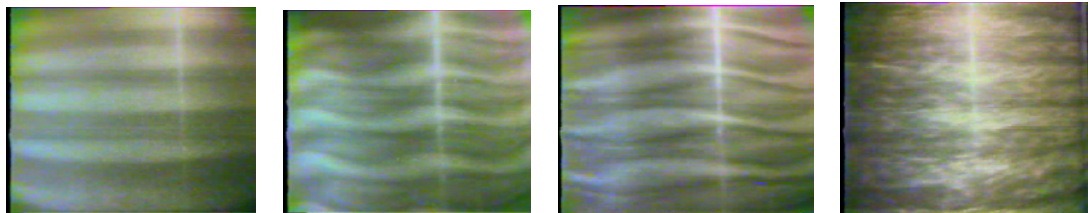


Fig. 3. The main transitional sequence of the closed Taylor-Couette flow.

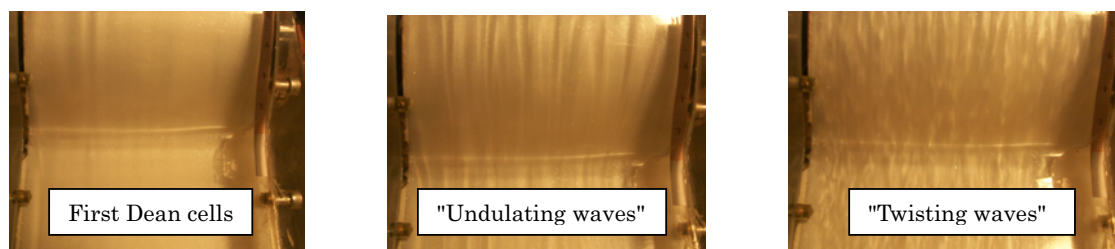


Fig. 4. The main transitional sequence of the Dean flow.

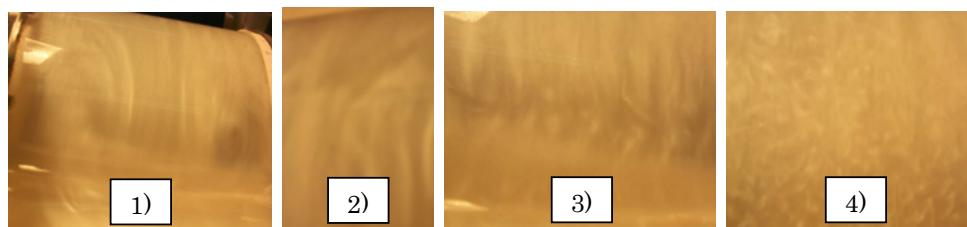


Fig. 5. Taylor-Dean flow : structures observed at 1) the entry, 2) the core, 3) the exit, 4) stochastic flow in the core.