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The motion of a rod in a rotating Stokes flow JAMES SEDDON, TOM MULLIN, Manchester Centre for Nonlinear Dynamics, School of Physics and Astronomy, University of Manchester, Oxford Road, Manchester, M13 9PL, UK — Results are presented of experimental investigations into the motion of a heavy rod in a rotating horizontal cylinder which is completely filled with highly viscous fluid. For a given rotation rate, a short, wide rod (ξ (= length/diameter) $\ll 1$) adopts a fixed position and rotates adjacent to the cylinder wall, in accord with previous measurements for spheres, cf. Ashmore *et al.* [Phys. Rev. Lett. **94**, 124501 (2005)]. A rotation rate can be ascribed to the rods, which is dependent on the position of the rod as well as the cylinder speed. As in the case of spheres, cavitation bubbles are present and have a direct effect on the motion. Longer rods ($\xi \gg 1$) exhibit full, 3-dimensional motion and tilt with respect to the cylinder axis. The effect of tilting is the rods drop down the wall and then laterally translate back and forth along it. Further interesting back spin effects are also found over a range of rotation rates.

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