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Large-eddy simulation of Taylor-Couette flow at relatively large Reynolds number WAN CHENG, King Abdullah University of Science and Technology, DALE PULLIN, California Institute of Technology, RAVI SAMTANEY, King Abdullah University of Science and Technology — We present large-eddy simulations (LES) of the incompressible Navier-Stokes equations for Taylor-Couette flow at relatively high Reynolds numbers. The ratio of the two co-axial cylinder diameters is fixed as $\eta = R_i/R_o = 0.909$ with R_i, R_o the inner and outer cylinder radii respectively. The outer cylinder is stationary while the inner cylinder rotates with constant angular velocity Ω_i, leading to the driving Reynolds number $Re_i = (R_o - R_i)\, R_i \Omega_i/\nu$ with ν the kinematic viscosity of the Newtonian fluid. Wall-resolved LES is implemented using the stretched-vortex, sub-grid scale model with Re_i in the range $10^5 - 3 \times 10^6$. We develop an empirical flow model for the $Re_{\tau_i} = F(\eta, Re_i)$ relationship where $Re_{\tau_i} = u_{\tau_i}\,(R_o - R_i)/(2\nu)$ is the inner-cylinder friction Reynolds number. Comparison of the model behavior with experimental data [van Gils *et al.*, *PRL*, 106, (2011), van Gils *et al.*, *J. Fluid Mech.*,706, (2012), Merbold *et al.*, *Phys. Rev. E*,87, (2013)], direct numerical simulation [Ostilla Mónico *et al.*, *J. Fluid Mech.*, 788, (2016)] and the present LES will be discussed.

Dale Pullin
California Institute of Technology

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