Numerical investigation of exact coherent structures in turbulent small-aspect-ratio Taylor-Couette flow\textsuperscript{1} MICHAEL KRYGIER, CHRISTOPHER J. CROWLEY, MICHAEL F. SCHATZ, ROMAN O. GRIGORIEV, Georgia Institute of Technology — As suggested by recent theoretical and experimental studies, fluid turbulence can be described as a walk between neighborhoods of unstable nonchaotic solutions of the Navier-Stokes equation known as exact coherent structures (ECS). Finding ECS in an experimentally-accessible setting is the first step toward rigorous testing of the dynamical role of ECS in 3D turbulence. We found several ECS (both relative periodic orbits and relative equilibria) in a weakly turbulent regime of small-aspect-ratio Taylor-Couette flow with counter-rotating cylinders. This talk will discuss how the geometry of these solutions guides the evolution of turbulent flow in the simulations.

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