Mode competition in modulated Taylor-Couette flow MARC AVILA, Universitat Politecnica de Catalunya, MICHAEL J. BELISLE, JUAN M. LOPEZ, Arizona State University, FRANCISCO MARQUES, Universitat Politecnica de Catalunya, WILLIAM S. SARIC, Texas A&M University — The effects of harmonically oscillating the inner cylinder about a zero mean rotation in a Taylor-Couette flow are investigated experimentally and numerically. The resulting time-modulated circular Couette flow possesses an involutive spatio-temporal symmetry which gives rise to two distinct modulated Taylor vortex flows. These flows are born at synchronous bifurcations, have the same spatial symmetries, but are characterized by different spatio-temporal symmetries and axial wavenumber. Mode competition between these two states has been investigated in the neighborhood where they bifurcate simultaneously. In the idealized numerical model, the two flows have been found to coexist and be stable in a narrow region of parameter space. However in the physical experiment neither state has been observed in the coexistence region. Instead, we empirically observe noise-sustained modes whose axial wavenumber varies as a function of time.

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