Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Characterizing the Subcritical Transition to Turbulence in Taylor-Couette Flow M.J. BURIN, D.L. DEFOOR, CSU San Marcos — The supercritical transition to turbulence in Taylor-Couette flow is a celebrated paragon of nonlinear dynamics, but the subcritical transition in this system has received much less attention. A few early experiments with the inner cylinder held stationary present to us a suggestive but incomplete picture of a 'catastrophic' transition to turbulence for sufficient outer cylinder speeds. But many questions remain about this shear-driven transition, such as the functional dependence of the critical Reynolds number on rotation, system curvature, cyclonicity, and finite-amplitude perturbations. To address these and related issues a large Taylor-Couette device has recently been constructed, allowing for access to turbulent regimes with either/both cylinders rotating. Some details of this new apparatus along with initial data pertaining to the subcritical transition will be presented.

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Date submitted: 08 Aug 2009 Electronic form version 1.4