

Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Multifractal Analysis of Vortex Pair Formation of Modified Taylor-Couette Flow in Laminar and Turbulent Regimes¹ THOMAS OLSEN, ADAM KOWALSKI, Lewis & Clark College, Portland, OR, RICHARD WIENER², Research Corporation — For sufficiently large effective Reynolds Numbers the formation of Taylor Vortex Pairs in Modified Taylor-Couette flow with hourglass geometry becomes irregular in time. At higher effective Reynolds Numbers the flow becomes turbulent, but Taylor Vortices may still be discerned. Again, for sufficiently high effective Reynolds Numbers, the formation of these vortex pairs becomes chaotic. Previously we have demonstrated that each process may be characterized as low dimensional chaos.³ We now present a multifractal analysis^{4,5} of these processes.

¹Supported by Research Corporation, the Rogers Science Research Program, and NSF DMR-0241814 & DMR-0241890.

²Formerly at Pacific University, Forest Grove, OR

³A. Kowalski, T. Olsen, & R. Wiener, Bull. Am. Phys. Soc. **50-9**, P1.00030 (2006).

⁴J. A. Glazier & A. Libchaber, IEEE Trans. On Circuits and Systems **35-7**, 790 (1988).

⁵T. Halsey, M. H. Jensen, L. P. Kadanoff, I. Procaccia, & B. I. Shraiman, Phys. Rev. A **33**, 1141 (1986).

Thomas Olsen
Lewis & Clark College

Date submitted: 05 Aug 2008

Electronic form version 1.4