Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

**Flow Prediction Using Low-Dimensional Methods** JULIE AUSSEUR, JEREMY PINIER, MARK GLAUSER, Syracuse University, HENRY CARLSON, Clear Science Corporation — Dynamical systems are developed and studied to be later integrated in an experimental flow-control algorithm. In this study, we focus our attention on the choice of the flow variable whose dynamics are modeled by the evolution equation. First we apply Proper Orthogonal Decomposition (POD) on the velocity variables, and a low-order dynamical system is obtained experimentally based on a Galerkin projection of the Navier-Stokes equation onto the POD eigenfunctions. We are then able to trace the evolution of the predicted POD modes and to compare them to original real-time data. Following a previous study, we also apply POD on the convection terms from the Navier-Stokes equations and compute a new POD basis along with eigenmodes from which an evolution equation is obtained using a curve fit method. A comparison between the prediction results of both variables will be established.

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Date submitted: 04 Aug 2006 Electronic form version 1.4