Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Closed-loop control of an experimental mixing layer using MLC[1]
VLADIMIR PAREZANOVIĆ, LAURENT CORDIER, BERND R. NOACK, ANDREAS SPOHN, JEAN-PAUL BONNET, PPRIME, Poitiers, France, THOMAS DURIEZ, Universidad de Buenos Aires, Argentinia, MARC SEGOND, MARKUS W. ABEL, Ambrosys GmbH, Germany, STEVEN BRUNTON, University of Washington, USA — A novel framework for closed-loop control of turbulent flows is tested for an experimental mixing layer flow. This framework, called Machine Learning Control (MLC), provides a model-free method of searching for the best control law (see talk of B. R. Noack). Here, MLC is benchmarked against classical open-loop actuation of the mixing layer. Results show that this method is capable of producing sensor-based control laws which can rival or surpass the best open-loop forcing, and be robust to changing flow conditions. Additionally, MLC can detect non-linear mechanisms present in the controlled plant, and exploit them to find a better type of actuation than the best periodic forcing. Other experimental shear-flow control studies with MLC will be presented in a talk by T. Duriez.

[1]Funding of the ANR Chair of Excellence TUCOROM, of the ANR grant SepaCoDe, of the EC's Marie-Curie ITN program, and of Ambrosys GmbH is acknowledged.

Bernd R. Noack
PPRIME, Poitiers, France

Date submitted: 31 Jul 2014 Electronic form version 1.4