Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Experimental study of axial forcing of a swirling jet AMY MCCLENEY, PHILIPPE BARDET, The George Washington University — Swirling jets enhance mixing of fluids. This leads to more complete combustion, chemical process mixings, lower plume temperatures, and reduced pollutant emissions. Mixing can be improved further by forcing instabilities in the jet and was tested on both non-swirling and swirling jets. These imposed disturbances are either axial, which generates vortex rings or angular, which create more complex structures. In this study, the effects of axial forcing on a swirling jet are experimentally investigated for Reynolds number ranging from 1,000 to 10,000, Swirl number from 0 to 1.3, and a Strouhal number from 0 to 15, where limited past experimental data exists within these flow regimes. This experiment offers insight into the flow structure of the swirling jet in the vortex breakdown region, as observed using PLIF with dye injected azimuthally on the jet periphery.

Philippe Bardet
The George Washington University

Date submitted: 05 Aug 2011 Electronic form version 1.4