Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Bifurcation and Turbulent transitions of round jets PHILIPPE BARDET, AMY MCCLENEY, The George Washington University — An experimental round jet is created by controlling the axial momentum injection rate, with the resulting water jet discharging freely into a large tank. The evolution and the transition to turbulence of round jets into a quiescent fluid are examined for Reynolds number ranging from 1,000 to 10,000. The boundary layer roll-up, merging of vortices, and turbulence transition of the jets natural instabilities are tracked from the nozzle exit. Near field measurements of the flow structures are observed using PLIF through azimuthal dye injection and PIV. These types of jets are observed both in nature and industrial applications. Understanding the early transition steps of a jet in detail is important in the view of efficient turbulence control. Modification of the natural fluid flow can lead to the delay in transition when turbulence is harmful or to promote instability when better mixing is beneficial. This study focuses on improving the understanding of jet flow structures for the development of flow manipulation.

Amy McCleney
The George Washington University

Date submitted: 05 Aug 2013 Electronic form version 1.4