

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Large scale structures in transitional pipe flow¹ LEO HELLSTRÖM, Princeton University, BHARATHRAM GANAPATHISUBRAMANI, University of Southampton, ALEXANDER SMITS, Princeton University, Monash University — We present a dual-plane snapshot POD analysis of transitional pipe flow at a Reynolds number of 3440, based on the pipe diameter. The time-resolved high-speed PIV data were simultaneously acquired in two planes, a cross-stream plane (2D-3C) and a streamwise plane (2D-2C) on the pipe centerline. The two light sheets were orthogonally polarized, allowing particles situated in each plane to be viewed independently. In the snapshot POD analysis, the modal energy is based on the cross-stream plane, while the POD modes are calculated using the dual-plane data. We present results on the emergence and decay of the energetic large scale motions during transition to turbulence, and compare these motions to those observed in fully developed turbulent flow.

¹Supported under ONR Grant N00014-13-1-0174 and ERC Grant No. 277472.

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Date submitted: 23 Jul 2015

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