Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Cylinder array height effects on evolution of tracked vortex packets within a turbulent boundary layer YAN MING TAN, ELLEN LONGMIRE, University of Minnesota — A zero pressure gradient turbulent boundary layer with $Re_\tau = 2480$ was perturbed by a spanwise array of cylinders. When a narrowly spaced array extended to the top of the log region, perturbed packets appeared to reorganize via a top-down mechanism, suggesting that packet organization can originate from above. We test this hypothesis by extending the array height to the edge of the boundary layer to completely disrupt the packet organization. On the other hand, previous measurements showed that the downstream packet organization was reinforced by an array spacing matching the dominant spanwise spacing of unperturbed packets. A shorter array with reduced blockage was tested to see whether the same effect is achievable. To compare the flow organization in the different cases, fixed and flying PIV measurements were obtained in streamwise-spanwise planes at multiple wall normal locations. The flying PIV system allows tracking and quantification of packet evolution through the array and over a distance of 7δ downstream.

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Date submitted: 29 Jul 2014 Electronic form version 1.4