

Abstract Submitted
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Boundary layer response to periodic spanwise perturbation by an array of obstacles YAN MING TAN, ELLEN LONGMIRE, University of Minnesota — Hot-wire and stereoscopic particle image velocimetry (SPIV) measurements were performed on zero pressure gradient turbulent boundary layers perturbed by a single array of cylinders extending into the log region. The array spacing had a strong effect on the resulting vortex packet organization. With 0.6δ array spacing, incoming vortex packets are frequently enhanced and remain stable over a downstream distance of 7δ . On the other hand, a 0.2δ spacing strongly disturbed incoming packets initially, but the incoming organization frequently reappeared by 2δ downstream. Measurements indicate that the effect of the perturbation is strongest in the mid-span location between array elements. Furthermore, hot-wire measurements suggest that the strongest velocity perturbations migrate upwards with increasing downstream distance. SPIV results in streamwise-spanwise planes at different heights will be compared to show how structural aspects of the perturbation vary with downstream distance.

Yan Ming Tan
University of Minnesota

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