Abstract Submitted
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Micro PIV measurements of turbulent flow over 2D structured roughness[1] JOEL HARTENBERGER, MARC PERLIN, University of Michigan — We investigate the turbulent boundary layer over surfaces with 2D spanwise square and triangular protrusions having nominal heights of 100 - 300 microns for Reynolds numbers ranging from $Re_\tau \approx 1500$ through $Re_\tau \approx 4500$ using a high speed, high magnification imaging system. Micro PIV analysis gives finely resolved velocity fields of the flow (on the order of 10 microns between vectors) enabling a detailed look at the inner region as well as the flow in the immediate vicinity of the roughness elements. Additionally, planar PIV with lower resolution is performed to capture the remainder of the boundary layer to the freestream flow. Varying the streamwise distance between individual roughness elements from one to ten times the nominal heights allows investigation of k-type and d-type roughness in both the transitionally rough and fully rough regimes. Preliminary results show a shift in the mean velocity profile similar to the results of previous studies. Turbulent statistics will be presented also.

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