

Abstract Submitted
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Measurement of entropy generation within bypass transitional flow RICHARD SKIFTON¹, RALPH BUDWIG², University of Idaho, DONALD MCELIGOT, Idaho National Laboratory, JOHN CREPEAU, University of Idaho — A flat plate made from quartz was submersed in the Idaho National Laboratory's Matched Index of Refraction (MIR) flow facility. PIV was utilized to capture spatial vectors maps at near wall locations with five to ten points within the viscous sublayer. Entropy generation was calculated directly from measured velocity fluctuation derivatives. Two flows were studied: a zero pressure gradient and an adverse pressure gradient ($\beta = -0.039$). The free stream turbulence intensity to drive bypass transition ranged between 3% (near trailing edge) and 8% (near leading edge). The pointwise entropy generation rate will be utilized as a design parameter to systematically reduce losses. As a second observation, the pointwise entropy can be shown to predict the onset of transitional flow. This research was partially supported by the DOE EPSCOR program, grant DE-SC0004751 and by the Idaho National Laboratory.

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