

Abstract Submitted
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Turbulence in a Hypersonic Boundary Layer OWEN WILLIAMS, ALEXANDER SMITS, Princeton University — Turbulent fluctuations in hypersonic boundary layers are conventionally collapsed using Morkovin scaling which has been shown to be broadly applicable up to Mach numbers as high as 5. To validate Morkovin's hypothesis at higher Mach numbers, and help improve our understanding of hypersonic wall-bounded turbulence, we report PIV measurements of two components of velocity fluctuations in a flat plate, turbulent boundary layer at Mach 7.4 in a perfect gas, at a Reynolds number based on momentum thickness of about 3500. Multiple tripping methods were evaluated to establish the sensitivity of the flow to initial conditions. Validation of the PIV results will be discussed and comparisons of various turbulent quantities will be made with DNS under identical flow conditions.

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