

Abstract Submitted
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Upstream and downstream influence on shock and turbulent boundary layer interactions¹ STEPHAN PRIEBE, MINWEI WU, M. PINO MARTIN, Princeton University — Direct numerical simulation data of a Mach 3, $Re_\theta = 2300$ turbulent boundary layer interacting with various shockwave configurations are considered. The shock unsteadiness is presented and correlations between the incoming flow and the shock motion, as well as the downstream flow and the shock unsteadiness are presented. Analyses on a compression corner configuration (Wu & Martin, 2007²) show that the unsteadiness of the separation bubble correlates with the low-frequency of the shock motion, giving a Strouhal number of 0.8 based on the low-frequency of the shock motion, the length of the separation bubble and the average maximum velocity of reversed flow. This scaling is assessed further in a reflected shock configuration.

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²Wu, M., Martin, M.P., “Analysis of shock motion in shockwave/turbulent boundary layer interaction using DNS data,” Accepted for publication in Journal of Fluid Mechanics, 2007.

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