

Abstract Submitted
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DNS of a Mach 7.2 turbulent boundary layer over square bar roughness elements¹ IZAAK BEEKMAN, PINO MARTIN, University of Maryland, CROCCO LAB TEAM — The direct numerical simulation of a turbulent, Mach 7.2 boundary layer over two-dimensional, square-bar roughness elements is presented. The physics of this flow are discussed, especially their similarities and differences with respect to compressible, smooth-wall, flat-plate boundary layers. Some interesting similarities exist, including the presence of near wall spanwise coherent structures and possible evidence of hairpin-packets. Additionally, the turbulence is characterized in terms of structure and statistics. The simulation technique and the challenges therein are also discussed, as the violent nature of the near wall region and the formation of transient shocks on the roughness elements makes this a challenging flow to study.

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