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Characterizing Coherent Structures in Supersonic, Turbulent Boundary Layers[1] MATTHEW RINGUETTE, M. PINO MARTIN, ALEXANDER SMITS, Princeton University — Using a direct numerical simulation database, we present a preliminary characterization of the properties of coherent structures in turbulent boundary layers at Mach numbers from 0.3 to 7. The attributes of organized turbulent motions, such as angle, length scale, convection velocity, and internal structure, as well as their variation with Mach number, are the subject of ongoing research. Moreover, there are little quantitative data on how the length scales of the streaky structures at the wall vary with Mach number. We describe a strategy for characterizing the instantaneous properties of coherent structures that are captured using various identification criteria. Structures that have been implicated in the production of turbulent stresses, such as the "legs" and "heads" associated with horseshoe vortices, as well as the wall streaks, are investigated.

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