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Examination of uniform momentum zones in hypersonic turbulent boundary layers OWEN WILLIAMS, University of Washington, CLARA HELM, PINO MARTIN, University of Maryland — The presence of uniform momentum zones (UMZs) separated by regions of high shear is now well-established in incompressible flows, with the mean number of such zones increasing in a log-linear fashion with Reynolds number. While known to be present in supersonic and hypersonic boundary layers, the properties of these UMZs and the appropriate Reynolds number for comparison with incompressible results have not previously been investigated. A large, previously published DNS database of hypersonic boundary layers is used in this investigation, with Mach numbers up to 12 and wall temperatures from cold to adiabatic, resulting in a wide range of outer layer Reynolds numbers. UMZs are examined using a range of parameters in both conventional inner and semi-local scalings, and Reynolds number trends examined.

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