

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Predictive Inner-Outer Model for Turbulent Boundary Layers Applied to Supersonic DNS PINO MARTIN, CLARA HELM, University of Maryland, College Park — A predictive wall model for subsonic turbulent boundary layers is modified for application to supersonic and hypersonic boundary layers. The original model is based on an observed modulation of the turbulence in the inner layer by the large scale motions in the logarithmic layer. Evidence that this modulating effect also exists in compressible turbulent boundary layers is presented. The appropriate scalings applied to the model to deal with compressibility effects is discussed. Spectrally resolved data sets from direct numerical simulation (DNS) of Mach 3 and Mach 7 turbulent boundary layers are used for validation of the modified model. Predicted inner layer velocity fields at the same flow conditions as the DNS data are constructed and a comparison of statistics, such as spectra and moments, of the predicted and DNS flow field parameters is presented. This work is supported by the Air Force Office of Scientific Research under grant AF/9550-10-1-0164.

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Date submitted: 28 Jul 2012

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