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**Turbulence Closures Uncertainties in Shock Boundary Layer Interactions** MICHAEL EMORY, RENE PECNIK, GIANLUCA IACCARINO, Stanford University — Reynolds averaged closures have limited predictive capabilities when applied to the problem of shock boundary layer interaction. Several modifications to RANS models have been proposed in the literature, including compressibility corrections, limiters, and alternative forms of the turbulence production terms. Our objective is to characterize the errors introduced by the various approximations used in typical two-equation models, such as turbulence isotropy, linear stress-strain relationship, dissipation rate, etc. by isolating each contribution separately. We use the barycentric map to alter the turbulence anisotropy and introduce realizable Reynolds stress perturbations to investigate the effect of potential modeling errors on the resulting wall pressure and shock position. This method of measuring structural uncertainty is compared against two traditional uncertainty quantification approaches which evaluate the effect of boundary condition and model coefficient variability on the quantities of interest. We also discuss how appropriate input uncertainty ranges are determined.

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