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***A priori* estimates of subgrid-scale terms for LES of shock-boundary layer interactions**[1] AVINASH JAMMALAMADAKA, FARHAD JABERI, Michigan State University, MICHIGAN STATE UNIVERSITY TEAM — The shock wave interaction with a turbulent boundary layer in high speed flows is very complex and requires high-fidelity numerical methods like direct numerical simulation (DNS) and large-eddy simulation (LES) to capture the flow physics. With the obvious limitations of DNS, we look upon LES as a viable alternative to provide us with an accurate description of shock-boundary layer interaction (SBLI) in high Reynolds number flows. Although there have been some promising results for SBLI, and compressible flows, in general, using LES, there still exists a potential to further improve the accuracy of the numerical model. In this study, *a priori* estimates of various subgrid-scale (SGS) terms in the compressible filtered Navier-Stokes equations are made using highly accurate DNS data for SBLI. The SGS stresses and their components, namely, Leonard, Cross and Reynolds, are examined in various regions of the flow for different shock strengths and filter widths. The backscatter in various regions of the flow was computed and was found to be significant only instantaneously. A term-by-term analysis of the SGS terms in the filtered total energy equations indicated that while each term was significant by itself, the net contribution by all the terms was relatively small and this was indicated in the *a posteriori* analysis as well.

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