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On the Temporal Evolution in Laminar Separated Boundary Layer Shock- Interaction Flows using DSMC[1] OZGUR TUMUKLU, DEBORAH A. LEVIN, UIUC, VASSILIS THEOFILIS, University of Liverpool — Hypersonic laminar boundary layer shock-interactions are characterized by spatial regions with both sub and supersonic flow in various degrees of thermochemical non- equilibrium and multiple length scales. The paper will explore the accurate modeling of such flows in a kinetic framework and address questions related to the role of velocity slip and temperature jump in stability and transition and how these may be influenced by vibrational non-equilibrium. We will discuss recent results that have been obtained with the first ever use of DSMC with linear stability and residuals algorithm analyses to address these questions. Amplitude functions of the least-damped linear global mode for a series of axisymmetric base flows over a double cone will be presented showing the predominant and repeating lambda shock structure at high Reynolds numbers, prior to transition.

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