

Interaction between an Unsteady Pressure Disturbance and a Hypersonic Boundary Layer

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ABSTRACT

The development of disturbances in a hypersonic boundary layer on a cooled surface is investigated in the case in which the characteristic velocity of disturbance propagation is small but greater than the flow velocity in the wall region of the triple deck disturbed scheme with interaction [1, 2].

The nonlinear boundary value problem formulated involves a single similarity parameter that characterizes the contribution made by the main, on average either subsonic or supersonic, region of the boundary layer to the generation of the pressure disturbance. In the linear approximation, an analytical solution and an algebraic dispersion equation are derived.

It is shown that only waves exponential in time and in the streamwise coordinate can propagate downstream when the main region of the undisturbed boundary layer is subsonic on average [3].

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References

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