

Abstract Submitted
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Development of second mode instability in a Mach 6 flat-plate boundarylayer with two-dimensional roughness QING TANG, CHUAN-HONG ZHANG, CUNBIAO LEE, None — The PCB pressure sensors and particle image velocimetry (PIV) are used to study the development of the second mode instability in a Mach 6 flow over a flat plate with two-dimensional roughness. A two-dimensional transverse wall blowing is used to enhance the second mode instability in the boundary layer and seeding tracer particles for PIV measurement. Three roughness elements with different heights are mounted at 125mm downstream the leading edge of the flat plate. It is proved that two-dimensional roughness could enhance the second mode fluctuation upstream the roughness. The second mode instability waves in flat-plate boundary layer are clearly shown by PIV and the boundary layer separation zone upstream the roughness is carefully measured. The boundary layer then reattaches the wall and the second mode instability waves are found damping downstream the roughness. It is also proved that the amplification and damping effect of the second mode instability waves depend on the height of the roughness.

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None

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