FM5S_10984

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

LDA Investigation of a Transonic Bump Flow

Holger Babinsky, Sebastien Prioris

University of Cambridge, UK

The transonic flow over a circular arc bump has been investigated in a blow-down wind-tunnel. A variety of shock strengths between M=1.2 and M=1.48, depending on the experimental configuration, have been achieved. In all cases separation was observed at the trailing edge of the bump, whereas shock induced separation was present only in flows with shock strengths above M=1.3. Laser Doppler Anemometry has been used to gather detailed information on turbulent flow properties. Good quality information was obtained as close to the wall as 0.1 mm. The results highlight the effects of favourable and adverse pressure gradients on turbulence properties, in particular the influence of shock waves and separation / reattachment. The recovery of the boundary layer downstream of re-attachment is also discussed. The data can help the understanding of shock / boundary layer interactions and the development of turbulence models for numerical simulations.

View the extended summary