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Shock induced separation: statistical link between shock motion and separated zone PIERRE DUPONT, IUSTI/CNRS UMR6595, JEAN-PAUL DUSSAUGE, JEAN-FRANÇOIS DEBIEVE, IUSTI/CNRS, SUPERSONIC TEAM — The interaction between an oblique shock wave impinging on a turbulent boundary layer at Mach number 2.3 is studied, for flow deviations of 8° and 9.5, which produce separation. Fluctuations of wall pressure are measured. The shock is strongly unsteady, with fluctuations at low frequency; in the separated zone, higher frequencies are measured, together with fluctuations in the shock frequency range. Measurements of coherence and phase shifts are made between the shock foot and points in the separated bubble. Strong coherence is found between these fluctuations, with a constant phase shift of π for the 8° deviation; more complex behaviours are found for 9.5°. A simple static scheme, based on the properties of the measured time histories of wall pressure is proposed; it reproduces correctly the out of phase signals in the 8° case, and the level of fluctuations along the interaction in the shock frequency range. This is compared with measurements of other authors in compression ramp flows. Moreover, PIV measurements are used to illustrate the dependence between the separation breathings and the position of the shock.

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