

Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

On oscillating shock layers of supersonic impinging jets MARTIN REIN, German Aerospace Center, Institute of Aerodynamics and Flow Technology, KONSTANTIN KLINKOV, Center of Applied Space Technology, University of Bremen — Shock layers of supersonic jets impinging on a plate are studied by means of multi-exposure photography and synchronized pressure measurements performed at the stagnation point on the plate. At certain nozzle-to-plate distances the bow shock formed ahead of the plate oscillates strongly. The pressure variations are strongly correlated with the oscillating shock. Peak frequencies are determined by a spectral analysis of the pressure signal. The spectra show a characteristic dependence of the peak frequencies on the nozzle-to-plate distance. The behavior of the primary peaks depends strongly on the characteristics of the supersonic jet (over/underexpansion). Frequencies of secondary peaks that decrease about inversely with the nozzle-to-plate distance, depend only little on the characteristics of the jet. In addition, low frequency bursts that occur for certain nozzle-to-plate distances are traced to the formation and destruction of a recirculation bubble.

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Date submitted: 26 Jul 2007

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