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Unsteady wall-pressure loading in a Mach 3 compression ramp flow at $Re_\theta = 2400$.[1] MATTHEW RINGUETTE, ALEXANDER SMITS, Princeton University, Princeton, NJ 08544 U.S.A. — We perform experiments to investigate the unsteady wall-pressure behavior in a Mach 2.9 shock-wave turbulent boundary layer interaction. The flow configuration is a nominally two-dimensional 24° compression ramp, and the Reynolds number based on momentum thickness is 2400. In contrast to measurements at higher Reynolds numbers (of order 10^4–10^5), the results show a smaller peak in the RMS of the wall-pressure fluctuations, and the wall-pressure signal exhibits a much richer intermittency in the shock-foot region. Spectra show that the signal energy is more evenly distributed over the range of shock oscillation frequencies, resulting in a smaller peak energy than that found at higher Reynolds numbers. The shock motion has a broadband frequency distribution with a peak slightly below 1 kHz, similar to the higher Reynolds number data. We find good agreement with the direct numerical simulation of Wu & Martín[2] at matching conditions.

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[2]Wu, M. & Martín, M. P. Direct numerical simulation of supersonic turbulent boundary layer over a compression ramp. *AIAA Journal* **45**(4), 2007, 879–889.

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