

Abstract Submitted
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Chasing eddies and their wall signature in turbulent boundary layers at Mach 3 through 14¹ I.B. BEEKMAN, S. PRIEBE, M.P. MARTIN, Princeton University, Princeton, NJ 08544 USA — We use a direct numerical simulation database of turbulent boundary layers,^{2,3,4} statistical tools,⁵ scientifically-rooted packet-pattern recognition,⁶ and validated visualization algorithms⁷ to identify hairpin packets and their wall signature. We investigate the variation of time scales and length scales associated with coherent structures and the role of hairpin packets on the generation of skin friction, wall-pressure loading and heat transfer.

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³Martin, M.P., AIAA Paper 2004-2337

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⁵Brown & Thomas, Phys. Fluids, vol. 20, pp 243-251, 1977

⁶Ringuette, Wu & Martin, JFM, vol. 594, pp. 59-69, 2008

⁷O'Farrell, C. Senior Thesis, Princeton University 2008

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