Abstract Submitted
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On the Introduction of Unsteady Streaks into a Blasius Boundary Layer Using Dynamically Actuated Roughness[1] KYLE BADE, AHMED NAGUIB, Michigan State University, Mechanical Engineering, PHILIPPE LAVOIE, University of Toronto, Institute for Aerospace Studies — Observations of the spatio-temporal growth of streamwise elongated streaks emanating from a cylindrical roughness element undergoing dynamic actuation into/out of a Blasius boundary layer are presented. Hot-wire measurements provide 2D maps of the disturbance velocity of these streaks. Modal decomposition methods are performed on these maps to evaluate the nature of the temporal growth of the streaks. For this analysis, various roughness element actuation heights, velocities, and accelerations are examined in order to identify the "dynamic-roughness" actuation parameters range for which transiently growing streaks can be produced while avoiding the introduction of T-S wave packets and/or non-linearly-growing disturbances. The establishment of such streaks with 5-10% disturbance magnitude will provide the basis for an experimental platform, and help develop efficient models for feedback bypass transition control in an ongoing study in collaboration with Princeton University.

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Kyle Bade
Michigan State University

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