

Abstract Submitted
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Conditional Sampling of Bypass Transition in Pressure Gradient Boundary Layers KEVIN NOLAN, TAMER ZAKI, Imperial College London — Conditional sampling of velocity fields from Direct Numerical Simulations (DNS) of bypass transition is performed with discrimination between laminar and turbulent events. Individual positive and negative streaks are isolated and an extreme value analysis of their amplitudes is performed. A more detailed view of the growth of positive and negative streaks is obtained than is typical by simply measuring the root mean square perturbations. The resulting velocity distributions are compared with the amplitudes of streaks which undergo secondary instability, and breakdown into turbulent spots. A range of pressure gradients is considered and the rates of turbulent spot production and propagation are investigated. While the spot production rate increases significantly with adverse pressure gradient, it is found that the spot propagation rate is unaffected. By considering the spot spreading angle others have shown a pressure gradient dependence of the propagation parameter. The current work eschews the spreading angle, opting instead to directly track the growth of the spot volume.

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