Abstract Submitted
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Non-parallel Flow Effects of Stationary Crossflow Vortices at their Genesis[1] ADAM BUTLER, XUESONG WU, Imperial College London — We investigate the linear stability of stationary Crossflow vortices whose spanwise wavenumber is sufficiently small that non-parallel flow effects play a leading order role in determining their growth rate. The chordwise and spanwise variations of the baseflow and the perturbation are of equal importance, and so must both be accounted for. Neutral modes can occur in this regime, which lies close to the leading edge. If the effective pressure minimum occurs within this regime, a new scaling for the lower deck must be determined along with a new governing equation for the perturbation. When the mode from the non-parallel regime is continued through the pressure minimum, it passes into a critical layer in the form of a Cowley, Hocking, & Tutty instability. Downstream of the effective pressure minimum, this critical layer will eventually pass into the main body of the boundary layer. This CHT instability can occur in a more general setting, when the first three derivatives of the effective velocity profile are zero at the wall.

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