

Abstract Submitted
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Bursting of Laminar Separation Bubbles O. N. RAMESH, ABHIJIT MITRA, Indian Institute of Science, Bangalore — The transition of a small laminar separation bubble (LSB) to a long LSB is called bursting, and this might be abrupt in some airfoils. Bursting is manifested as a significant departure of the surface pressure distribution from its inviscid pressure distribution, with a considerable drop in the peak suction pressure. In our present study of flow over Eppler387 at an angle of attack of 8 degrees, we have chosen three representative LSBs: long, transitional and short bubbles. Bursting has been often linked to the onset of absolute instability of the separated shear layer. On impulsively forcing these three bubbles, it is found that all the bubbles are convectively unstable in the high-frequency range. However, all of them, though an order of magnitude lesser in short bubbles, show tendencies of absolute instability in the low-frequency range. A self-limiting behavior for the unforced transitional and long LSBs is evident. An explosive growth of high-frequency activity is found to be strongly correlated to the low-frequency flapping motion of the longer bubbles. Negative production of turbulent kinetic energy is responsible for the runaway effect observed during bursting.

Abhijit Mitra
Indian Institute of Science, Bangalore

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