

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Structure of relaminarizing turbulent boundary layers** O. RAMESH, SAURABH PATWARDHAN, Indian Institute of Science — Relaminarization of a turbulent boundary layer in a strongly accelerated flow has received a great attention in recent times. It has been found that such relaminarization is a general and regularly occurring phenomenon in the leading-edge region of a swept wing of an airplane (van Dam et. al., 1993). In this work, we investigate the effect of initial Reynolds number on the process of relaminarization in turbulent boundary layers. The experimental and numerical investigation of relaminarizing turbulent boundary layers undergoing same history reveals that the boundary layer with higher initial Reynolds number relaminarizes at a lower pressure gradient value compared to the one with lower Reynolds number. This effect can be explained on the inviscid theory proposed earlier in the literature. Further, various parameter criteria proposed to predict relaminarization, are assessed and the structure of relaminarizing boundary layers is investigated. A mechanism for stabilization of near-wall low speed streaks is proposed.

O. Ramesh  
Indian Institute of Science

Date submitted: 01 Aug 2014

Electronic form version 1.4