

Abstract Submitted
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Evolution of wavepacket over short compliant panels in a Blasius boundary layer IGE BORI, K.S. YEO, National University of Singapore, HUA-SHU DOU, Zhejiang University of Science Technology, Hangzhou, China, XIJING ZHAO, National University of Singapore — Compliant surface has been proved in various theoretical studies as a promising tool in delaying transition. This study concerns our recent work carried on the evolution of pulse-initiated disturbance wavepackets over finite-length compliant panels in a Blasius boundary layer by direct numerical simulation (DNS) method. A finite section of the wall was replaced by a tensioned membrane on a damped foundation. By comparing with the rigid wall case, the upstream intervention by a finite compliant panel was found to effectively delay the onset of the incipient turbulent spot – an increase of about 51% in the transition distance with respect to the initiation point was obtained. Transition distance to the occurrence of the incipient turbulent spot was increased further to about 84% relative to a rigid wall when a second compliant panel was introduced. Spectral analysis shows the important role of the fundamental 2D modes in wavepacket evolution and the roles played by compliant panels in transition delay.

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