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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 40% 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 75% 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.

Prefer Oral Session
 Prefer Poster Session

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