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Reinforcement of steady streaks for consecutive transition delay[1]
SOHRAB S. SATTARZADEH, JENS H. M. FRANSSON, Linné Flow Centre, KTH Mechanics — Miniature vortex genrators (MVGs) are recently proven efficient as passive control devices to delay the turbulence transition on a flat plate boundary layer by modulating the base flow in the spanwise direction, through generating steady streamwise elongated streaks, and hence reducing the skin-friction drag[2]. As the MVGs are localized in the streamwise direction, a shortcoming of the passive laminar control is the recovery of the two-dimensional boundary layer which force the control effects to fade away. In the present study we show that by placing a second array of MVGs downstream of the first one the streamwise extent of the control can be prolonged by reinforcing the steady streaks in the streamwise direction. The reinforced passive control strategy results in consecutive turbulence transition delay with obtaining a net skin-friction drag reduction of 65%, for the present measurement conditions, compared to the smooth plate boundary layer.

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[2]Shahinfar, S., Sattarzadeh, S. S., Fransson, J. H. M., Talamelli, A. *Phys. Rev. Lett.* **109**, 074501, 2012.

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