

Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Preliminary numerical assessment of turbulent skin friction control with plasma actuators BETTINA FROHNAPFEL, ANTONIO CRISCIONE, CAMERON TROPEA, Technical University Darmstadt, YOSUKE HASEGAWA, NOBUHIDE KASAGI, The University of Tokyo — Plasma actuators (PA) introduce a body force in the near-wall region of a fluid flow. This body force has already been successfully used for separation and transition flow control. We investigate the possibility of applying PAs to turbulent skin friction drag reduction by testing the effect of a modelled PA's body force in a numerically simulated turbulent channel flow. The body force is implemented into a control loop, which aims at impeding the spanwise velocity component near the wall surface. We assume to employ distributed sensors and actuators of finite size in order to investigate optimum actuator sizes for practical applications. Since the detailed physics of the body force generation by PAs and the resulting force distributions are still under study and a matter of discussion, we employ different models for the force distribution with the goal to identify the critical requirements for skin friction drag reduction with PAs.

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Date submitted: 10 Aug 2009

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