

# Cylinder Wake Modification by a Surface HF Discharge Actuator

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Recently, there is a wide interest towards flow control by means of different plasma actuators. Flow control by DBD actuators is studied in [1] at low Re numbers and flow velocity. This work is a continuation of our previous one, focused on surface HF plasma actuator [2].

Study of flow control near cylinder model (40 mm diameter) by surface HF plasma actuator has been performed at velocity range up to 30m/s, atmospheric pressure and Reynolds number  $Re \sim 10^5$ .

It is shown that it is possible to control vortex shedding from the cylinder surface and average wake width by pulsed repetitive surface HF discharge.

HF discharge (carrier frequency – 500 kHz, pulse repetitive frequency -  $F_M=10-2000$  Hz) is used in this plasma aerodynamic experiment. Effects of modulation frequency  $F_M$  and actuator position on flow parameters are studied.

Flow visualization is realized by means of smoke injection near body in airflow and by laser shadowgraphy. Flow parameters behind the cylinder are measured by Pitot's tubes.

[1] Plasma-Based Actuators for Cylinder Wake Vortex Control, Thomas E. McLaughlin et.al., AIAA 2004-2129

[2] Surface HF Plasma Aerodynamic Actuator, Klimov A., Bityurin V., Moralev I., Tolkunov B., Zhirnov K., AIAA 2008-1411