

Abstract Submitted
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On the pulsating electric wind of a Single Dielectric Barrier Discharge (SDBD) plasma actuator¹ JULIE VERNET, RAMIS ÖRLÜ, P. HENRIK ALFREDSSON, Linné FLOW Centre, KTH Mechanics, Stockholm, Sweden — An experimental study is conducted on the electric wind produced by a Single Dielectric Barrier Discharge (SDBD) plasma actuator placed at the top of a half cylinder. Laser Doppler Velocimetry (LDV) measurements were performed and results show that increasing the driving voltage (6-16 kV peak-to-peak) and frequency (0.5-2 kHz) of the actuator increases the induced jet velocity (up to 4 m/s) and thus the momentum added by the actuator. The focus of the present study is on the phase-resolved behavior of the electric wind, in particular, its two strokes. Phase-averaged LDV data reveals that while the velocity during both strokes remains positive, there is nearly a factor of two in amplitude. The difference of behavior between the two strokes and its downstream and wall-normal evolution are mapped for various driving voltages. Results indicate that this difference is restricted to the vicinity of the actuator, thereby justifying the assumption of a steady force in simulations to model the induced force. The study is part of a larger investigation aiming at separation control on the A-pillar of a truck cabin.

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