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DBD Control of a Turbulent Shear Layer downstream of a Backward Facing Step JEAN PAUL BONNET, PATRICIA SUJAR-GARRIDO, NICOLAS BENARD, ERIC MOREAU, CNRS University of Poitiers — An open loop control of a turbulent free shear layer downstream of a backward-facing-step at $Re\ 3 \times 10^4$ is performed via a single Dielectric Barrier Discharge (DBD). Several actuation locations are tested, the best result being observed at the hinge of the step. Nanosecond DBD have been tested with no efficiency on the location of the reattachment location. By using AC DBD, a linear evolution of the reattachment is observed. Optimization of frequency, duty cycle and voltage amplitude is performed. An optimal frequency is observed and it is shown that the plasma discharge is able to manipulate the first stages of the formation of the free shear layer and consequently to modify the flow dynamics of the entire flow, with a regularization of the vortex shedding frequency.

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