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Periodic forcing of a Turbulent Axisymmetric Wake[1] JONATHAN MORRISON, ALA QUBAIN, Department of Aeronautics, Imperial College — The near wake of a blunt, axisymmetric body subject to periodic forcing is investigated. A high-fidelity speaker located inside the cylinder is used to generate a pulsed jet from a small circumferential gap located on the underside of the separating boundary layer, with its axis aligned in the streamwise direction. A detailed investigation of the growth of the disturbances is performed using hot wires, PIV and base-pressure transducers. It is shown that, with azimuthal symmetric forcing (m =0), the base pressure may be reduced by 30% at "low" frequencies or increased by 10%, at "high" frequencies with consistent changes to the velocity field. As in previous, similar investigations, it is shown that the important scaling parameter is the boundary-layer momentum thickness at separation - in contrast to other geometries such as a 2D bluff body for example, where the von Kármán vortex shedding is universal, or control of separating-reattaching flows, where a range of actuation frequencies is often effective. Moreover, caution is required when comparing to other axisymmetric bodies because the wake is quite sensitive to boundary conditions and the nature of separation from the body. Many previous studies have demonstrated successful alterations of the wake of a 3D bluff body, all using passive geometric modifications.

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