

Abstract Submitted
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Turbulent wakes of irregular objects MARTIN OBLIGADO, JOHN CHRISTOS VASSILICOS, Imperial College London — Recently, flow regions with non-equilibrium high Reynolds number turbulence at odds with usual Richardson-Kolmogorov phenomenology have been discovered in a number of turbulent flows, in particular axisymmetric and self-preserving turbulent wakes of plates with irregular edges. These regions are characterised by streamwise evolutions of the mean flow profiles which have only recently been documented, see PRL 111, 144503 (2013). One of the main differences between the equilibrium and the non-equilibrium predictions involves the momentum thickness. We therefore have carried out experiments with bluff bodies that have various different chord lengths in the direction of the flow. We performed wind tunnel anemometry measurements of wakes generated by bluff plates with simple square edge peripheries and by bluff plates with irregular edge peripheries which allow the formation of jet-wake flows. The wakes generated by the irregular plates become axisymmetric much earlier than the wakes generated by regular ones, irrespective of chord length. Furthermore, the non-equilibrium wake scalings are present in the case of the bluff plates with irregular edges, again irrespective of chord length.

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