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Global stability analysis of turbulent 3D wakes GEORGIOS RIGAS, University of Cambridge, DENIS SIPP, ONERA DAFE, MATTHEW JUNIPER, University of Cambridge — At low Reynolds numbers, corresponding to laminar and transitional regimes, hydrodynamic stability theory has aided the understanding of the dynamics of bluff body wake-flows and the application of effective control strategies. However, flows of fundamental importance to many industries, in particular the transport industry, involve high Reynolds numbers and turbulent wakes. Despite their turbulence, such wake flows exhibit organisation which is manifested as coherent structures. Recent work has shown that the turbulent coherent structures retain the shape of the symmetry-breaking laminar instabilities and only those manifest as large-scale structures in the near wake (Rigas *et al.*, JFM vol. 750:R5 2014, JFM vol. 778:R2 2015). Based on the findings of the persistence of the laminar instabilities at high Reynolds numbers, we investigate the global stability characteristics of a turbulent wake generated behind a bluff three-dimensional axisymmetric body. We perform a linear global stability analysis on the experimentally obtained mean flow and we recover the dynamic characteristics and spatial structure of the coherent structures, which are linked to the transitional instabilities. A detailed comparison of the predictions with the experimental measurements will be provided.

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