

Abstract Submitted  
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**Into the far wake: simulations of the high-Reynolds-number wake of a slender body**<sup>1</sup> JOSE LUIS ORTIZ-TARIN, SHEEL NIDHAN, SUTANU SARKAR, University of California, San Diego, SARKAR'S LAB TEAM — The high-Reynolds-number axisymmetric wake behind a slender 6:1 prolate spheroid with a tripped boundary layer is investigated using a hybrid simulation. The Reynolds number based on the diameter is  $10^5$  and the domain spans  $x/D = 80$ . The classic hypotheses that lead to the well-known high-Reynolds-number wake decay exponents are not fulfilled in our domain, despite the presence of broadband turbulence in the near wake and without discernible vortex shedding from the body. Instead, after  $x/D \approx 20$  and until the end of the domain, self-similarity with anomalous wake decay is found. At  $x/D \approx 20$ , a helical wake instability also emerges and the wake transitions into a non-equilibrium scaling of dissipation rate. The effect of density stratification on the wake is also investigated. The decay laws, the generation of gravity waves and the presence of coherent structures are studied in weak ( $Fr = 10$ ) and strongly stratified environments ( $Fr = 2$ ).

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