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Steady imperfect bifurcation with generic 3D bluff bodies at large Reynolds numbers OLIVIER CADOT, ENSTA-ParisTech, LUC PASTUR, LIMSI, ANTOINE EVRARD, GUILLAUME SOYER, ENSTA-ParisTech — The turbulent wake of parallelepiped bodies exhibits a strong bi-modal behavior. The wake randomly undergoes symmetry breaking reversals, between two mirror asymmetric steady modes (RSB modes). The characteristic time for reversals is about 2 or three orders of magnitudes larger than the natural time for vortex shedding. Such a dynamics has been recently observed on real car which points out its importance about industrial applications. Both the viscosity and the proximity of a wall in the vicinity of the parallelepiped body (similarly to the road with a car model), stabilize the RSB modes on a single symmetric mode. It is shown that these stabilizations occur through imperfect fork bifurcations at large Reynolds numbers. The extra drag due to the presence of the RSB modes is evidenced.

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