

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Direct Numerical Simulation of an Adverse Pressure Gradient Turbulent Boundary Layer at the Verge of Separation¹ VASSILI KITSIOS, CALLUM ATKINSON, Monash University, JUAN SILLERO, BORRELL GUILLEM, Universidad Politécnica de Madrid, AYSE GUNGOR, Istanbul Technical University, JAVIER JIMENÉZ, Universidad Politécnica de Madrid, JULIO SORIA, Monash University — We investigate the structure of an adverse pressure gradient (APG) turbulent boundary layer (TBL) at the verge of separation. The intended flow is generated via direct numerical simulation (DNS). The adopted DNS code was previously developed for a zero pressure gradient TBL. Here the farfield boundary condition (BC) is modified to generate the desired APG flow. The input parameters required for the APG BC are initially estimated from a series of Reynolds Averaged Navier-Stokes simulations. The BC is implemented into the DNS code with further refinement of the BC performed. The behaviour of the large scale dynamics is illustrated via the extraction of coherent structures from the DNS using analysis of the velocity gradient tensor and vortex clustering techniques.

¹The authors acknowledge the research funding from the Australian Research Council and European Research Council, and the computational resources provided by NCI and PRACE.

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Date submitted: 01 Aug 2014

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