Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Exact localized free-stream coherent structures in a parallel boundary layer TOBIAS SCHNEIDER, EPFL - Lausanne, JOHN GIBSON, University of New Hampshire, TOBIAS KREILOS, EPFL - Lausanne — The dynamical systems description of transitional turbulence is based on exact invariant solutions of the 3D Navier-Stokes equations. We present a new family of exact traveling wave solutions in the asymptotic suction boundary layer. The solutions are localized in wall-normal and spanwise direction. Instead of being attached to the wall, the solutions are dominated by vortical structures reaching far into the free-stream region. These invariant solutions thus suggest that dynamical systems concepts, so far mostly studied in confined geometries, can carry over to open boundary layers and are relevant for turbulence far from confining walls.

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Date submitted: 29 Jul 2015 Electronic form version 1.4