Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

The intermittency of the inner layer of turbulent boundary layers. JAMES WALLACE, University of Maryland, XIAOHUA WU, Royal Military College of Canada, PARVIZ MOIN, ADRIAN LOZANO-DURAN, JINHIE SKARDA, Stanford University, JEAN-PIERRE HICKEY, University of Waterloo — Uncovering the constitutive coherent structure inside the inner region ($y^+ < 100$) of the canonical turbulent boundary layer has remained a central research focus for decades. At last years DFD meeting we showed the ubiquity of spatially intermittent concentrations of vortices within the buffer layer and viscous sublayer with characteristics remarkably like those of transitional-turbulent spots. We call these concentrations of vortices with high swirling strength "turbulent-turbulent" spots because they originate and grow within the developed turbulence region of the flow. The turbulent-turbulent spots cause indentation, segmentation and termination of the passive viscous sublayer streaks, confirming and explaining, for the first time, the experimental visualization of viscous sublayer "pockets" of Falco (1980). The turbulent-turbulent spots also coincide with local concentrations of high levels of Reynolds shear stress, enstrophy and temperature fluctuations. In this presentation we will quantify the spatial intermittency characteristics of these turbulent-turbulent spots and compare them with those of the transitional-turbulent spots. See PNAS 114 (27) 2017 for complete details.

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Date submitted: 14 Jul 2017 Electronic form version 1.4