Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Scale contributions to inertial layer momentum transport in turbulent boundary layers[1] JUAN CARLOS CUEVAS-BAUTISTA, University of New Hampshire, CALEB MORRIL-WINTER, University of Melbourne, JOSEPH KLEWICKI, CHRISTOPHER WHITE, GREGORY CHINI, University of New Hampshire — A weight of evidence indicates that the inertial region of the turbulent boundary layer is physically composed of large scale uniform momentum zones segregated by narrow *fissures* of highly vortical flow. Relative to momentum transport, this physical structure predominantly stems from the correlation between the wall-normal velocity fluctuations, v, and the spanwise vorticity fluctuations, ω_z. The present research seeks to better understand how the relative scales of the v and ω_z motions contribute to this advective transport mechanism under increasing scale separation associated with increasing Reynolds number. The broader aim is to advance an asymptotically reduced partial differential equation model of the turbulent boundary layer. Here we report on spectral analyses of high resolution, high Reynolds number measurements acquired using a four wire hotwire sensor. The focus is on quantifying the scales associated with the individual v and ω_z signals, as well as the predominant scales associated with their correlation.

[1]This research is supported by the National Science foundation and the Australian Research Council.

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Date submitted: 02 Aug 2015 Electronic form version 1.4