Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Active and Inactive Motions in the Streamwise Reynolds Stress of Boundary Layers. RONALD PANTON, University of Texas, ROBERT MCKEE, Southwest Research Institute — The streamwise normal Reynolds stress $<uu>(y, Re)$ in wall layers does not scale simply with the friction velocity u_* as many researchers have shown recently. For example, Degraaff and Eaton (JFM, **422,** p 319) and Metzger and Klewicki (P of F, **13**, p 692) propose the scaling $< uu > /(U_0/u_*)$. In this talk we adopt Townsend's idea that the streamwise fluctuations consist of active motions, which produce the Reynolds shear stress $<uv>$ and inactive motions, which do not contribute to the Reynolds shear stress $<uv>$. It has been proposed, Panton (Phil. Trans. R. Soc. A (2007) **365**, p733) that these motions scale differently. It is assumed that the inactive correlation scales as $< u_I u_I > /$ ($U_0/u_{*.}$) while all other parts of $<uu>$, which in concept are related to the Reynolds shear stress $<uv>$, scale with u_*^2. Data for zero-pressure-gradient boundary layer flows is analyzed from this viewpoint. In order to extract the inactive correlation $< u_I u_I >$ it is assumed that the other motions are some constant fraction of the Reynolds shear stress <uv>. Fitted equations to the inner and outer regions allow a composite expansion to predict the streamwise Reynolds stress as a function of y and Re_*.

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Date submitted: 06 Aug 2007 Electronic form version 1.4