A critical layer analogy for the very large scale motions in wall turbulence BEVERLEY MCKEON, California Institute of Technology, ATI SHARMA, Imperial College London — A concatenation of experimental results in wall turbulence has shown the importance of the very large scale motions (VLSMs) in the streamwise direction, of the order of ten outer lengthscales. While Sreenivasan (1988) proposed a critical layer description of the variation of the wall-normal location of the peak in Reynolds shear stress, namely $y_{pk}^+ \sim R^{+1/2}$, where $y^+ = yu_\tau/\nu$, in this presentation we extend the critical layer interpretation to explain the existence and scaling of the VLSMs. An analytical expression for the location of peak streamwise VLSM energy agrees well with experimental results, including the hot-wire results of Morrison et al (2004) from the Princeton/ONR Superpipe.

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Date submitted: 06 Aug 2009   Electronic form version 1.4