

Abstract Submitted
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Net Force Spectra of Wall Turbulence RONALD ADRIAN, JON BALTZER, Arizona State University — In the mean momentum equation for turbulent flow the net force vector is the divergence of the turbulent Reynolds stress. In many ways it is a simpler and more fundamental quantity than the Reynolds stress. Wavenumber spectra of the streamwise net force in pipe and channel flows are shown to be similar. They define the layer structure more clearly than the mean velocity, and they show that long streamwise wavelength motions are predominantly accelerative near the wall, while short streamwise wavelengths are decelerative above the buffer layer. Spanwise wavenumber spectra provide a simpler map of the net force than the streamwise spectra, and in terms of them there is a simple boundary between accelerative and decelerative wavelengths as a function of distance above the wall.

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