Abstract Submitted
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The relationship between amplitude modulation, coherent structure and critical layers in wall turbulence[1] BEVERLEY MCKEON, California Institute of Technology — The importance of critical layers in determining aspects of the structure of wall turbulence is discussed. We have shown (Jacobi & McKeon, 2013) that the amplitude modulation coefficient investigated most recently by Hutchins & Marusic (2007) and co-authors, which describes the correlation between large scales above a (spatial) wavelength filter with the envelope of small scales below the filter, is dominated by very large scale motion (VLSM) at a single wavelength. The resolvent analysis of McKeon & Sharma (2010) gives a suitable model for the three-dimensional, three-component form of the VLSM and energetic structure at other wavelengths. This model is used to identify the three-dimensional spatial variation of instantaneous critical layers in the presence of a mean velocity profile and to relate this to earlier observations of coherent structure in unperturbed flows (both experimental and via the resolvent model, Sharma & McKeon, 2013); to the phase relationships between scales identified by Chung & McKeon (2010, 2014); and to the structure of wall turbulence that has been modified by the addition of single synthetic scales, e.g. Jacobi & McKeon (2011), Duvvuri & McKeon (2015).

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