

Abstract Submitted
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DNS study of amplitude modulation statistics of turbulent channel flows over rough walls SICONG WU, University of Illinois at Urbana-Champaign, KENNETH CHRISTENSEN, University of Notre Dame, CARLOS PANTANO, University of Illinois at Urbana-Champaign — DNS of long turbulent channel flows over rough walls at friction Reynolds number up to 400 are considered. The walls are hexagonally packed with hemispheres with roughness height $h/k=10$ and 20 and average spacing between hemispheres from 2 to 4 times the roughness height. A conforming grid approach (unstructured) using spectral finite elements is used to fully resolve the flow with up to 1.6 billion grid points. Analysis of two-point correlation and Hilbert transform applied to the spectrally filtered fluctuating velocity signals is used to study the interaction between large-scale and small-scale turbulence structure. The talk focuses on the effect of roughness parameters on the amplitude modulation accuracy, both for the wall-parallel and wall-normal velocities.

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