An investigation of the flow modification in a turbulent channel with gain-based optimal forcing[1] ARJUN SHARMA, University of Texas, Austin, RASHAD MOARREF, MITUL LUHAR, California Institute of Technology, Pasadena, DAVID GOLDSTEIN, University of Texas, Austin, BEVERLEY MCKEON, California Institute of Technology, Pasadena — Direct numerical simulations of turbulent channel at $Re_\tau = 180$ with two-dimensional traveling wave forcing are performed. The chosen forcing parameters, that is, the wall-parallel wavelength and wave-speed, are representative of the near-wall cycle. The wall-normal forcing shape is obtained using the resolvent analysis of McKeon & Sharma (Journal of Fluid Mechanics, vol. 658, 2010). The results obtained from direct simulations are found to compare well with the resolvent analysis predictions for different forcing amplitudes. The turbulence statistics and visualizations of three-dimensional unsteady flow field shed light on the flow evolution in response to forcing.

Arjun Sharma
University of Texas, Austin

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