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**The effect of spatial discretization upon traveling wave body forcing of a turbulent wall-bounded flow** SOYOUNG YOU, DAVID GOLDSTEIN, University of Texas at Austin — DNS is employed to simulate turbulent channel flow subject to a traveling wave body force field near the wall. The regions in which forces are applied are made progressively more discrete in a sequence of simulations to explore the boundaries between the effects of discrete flow actuators and spatially continuum actuation. The continuum body force field is designed to correspond to the "optimal" resolvent mode of McKeon and Sharma (2010), which has the L2 norm of $\sigma_1$. That is, the normalized harmonic forcing that gives the largest disturbance energy is the first singular mode with the gain of $\sigma_1$. 2D and 3D resolvent modes are examined at a modest $\mathrm{Re}_\tau$ of 180. For code validation, nominal flow simulations without discretized forcing are compared to previous work by Sharma and Goldstein (2014) in which we find that as we increase the forcing amplitude there is a decrease in the mean velocity and an increase in turbulent kinetic energy. The same force field is then sampled into isolated sub-domains to emulate the effect of discrete physical actuators. Several cases will be presented to explore the dependencies between the level of discretization and the turbulent flow behavior.

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