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Wall Boundary Conditions for Two Point Correlations MICHAEL NILSSON, J. BLAIR PEROT, University of Massachusetts Amherst — The reaction of isotropic homogeneous turbulent flow to the instantaneous insertion of a wall is investigated using direct numerical simulation (DNS). At small time-scales, the viscous terms have yet to affect the flow. Therefore, the wall boundary condition implemented is a free-slip wall. Analysis of the velocity fields is performed using two-point correlations taken over planes parallel to the wall placement. In this talk, the resulting two-point correlations are presented, and a model to predict the behavior of the two-point correlations is also proposed. The strengths of the model are presented, in relation to the orientation of the wall placement in the domain. It will be shown that for correlations involving the wall-normal velocity component, the predictive model performs exceptionally well at high resolutions. The decomposition of the two-point correlations was performed in order to gain a better understanding of the effects of the boundary conditions, and is presented. The investigation into the role of vorticity for further development of the predictive model involving the non-normal terms will also be discussed.

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