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Towards Wall-Modeled LES using High-Order Discontinuous Galerkin Methods YU LV, Mississippi State Univ, XIANG YANG, GEORGE PARK, MATTHIAS IHME, Stanford University — This talk presents a DG-based wall model technique for large-eddy simulations. Wall modeling capability plays a key role for enabling high-fidelity simulations of external aerodynamics and wall-bounded flows at very high Reynolds-numbers. Previous development of wall models was primarily based on finite-difference or finite-volume schemes. The performance of wall models in the DG framework has not yet been well understood. In this study, we investigate the equilibrium wall model in a configuration of turbulent channel flow. The detailed implementation for integrating the wall model into a DG solver will be presented. The accuracy of the DG-based WMLES technique will be compared against the conventional WMLES that were developed based on finite-volume methods. The importance of utilizing subgrid-scale models will be highlighted. Practical implication of this new WMLES technique onto more complex flow configurations will be discussed.

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