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Multifidelity ensemble-based prediction of turbulent flows at the Exascale[1] LLUIS JOFRE, MANOLIS PAPADAKIS, ALEX AIKEN, GIANLUCA IACCARINO, Stanford University — The study of complex multiphysics turbulent flows is commonly based on intensive computational high-fidelity simulations. To build confidence and improve their prediction accuracy, very large computational budgets are typically required to characterize the impact of uncertainties on the quantities of interest. In this regard, multifidelity methods have become increasingly popular in the last years as acceleration strategies. Exascale computing resources promise to facilitate the use of these approaches on larger scale problems by providing 1-10k times augmented floating-point capacity, but at expenses of requiring more complex data management as memory is expected to become more heterogeneous and distributed. The objective of this work, therefore, is to explore the performance of multifidelity ensemble-based strategies in large-scale multiphysics applications using an Exascale-ready computational framework.

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