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LES/PDF of Sandia flame D using a coupled adaptive chemistry and tabulation approach[1] ASHISH NEWALE, YOUWEN LIANG, STEPHEN POPE, PERRINE PEPIOT, Cornell University — LES/PDF methods are known to provide accurate results for challenging turbulent combustion configurations. This higher level of fidelity, however, comes at the cost of added computational expense compared to other state-of-the-art methods. To reduce the magnitude of this cost differential, the majority of LES/PDF computations performed to date have used reduced mechanisms. We have recently proposed a coupled adaptive chemistry and tabulation approach to enable the use of the detailed mechanisms in LES/PDF computations. Specifically, we proposed a coupled pre-partitioned adaptive chemistry (PPAC) and in-situ adaptive tabulation (ISAT) method (Newale et al., CTM 2019). The proposed coupled method showed encouraging results in a partially stirred reactor configuration. In this work, we examine the performance of the coupled PPAC-ISAT method in a LES/PDF computation of Sandia flame D. We demonstrate that the coupled technique enables the use of detailed mechanisms at a significantly reduced computational cost, while retaining the level of fidelity attained by using the detailed mechanism without approximations.

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