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High-order AMR computations of chemically reacting flows

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We present a recently developed high-order projection scheme
for the study of low-Mach number chemically reacting flows. The numerical approach
for the momentum transport uses a combination of cell-centered/cell-averaged
discretizations to achieve a high-order formulation for the pressure projection
algorithm. This scheme is coupled with an operator-split stiff approach for
the species and energy equations. The code employs a block-structured
high-order adaptive mesh refinement approach to tackle the challenges
posed by the large spectrum of spatial scales encountered in reacting
flow computations. The numerical construction is used to examine detailed
flame structure dynamics for several canonical laminar flame configurations.