Abstract Submitted
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Optimal Numerical Schemes for Compressible Large Eddy Simulations[1] AYABOE EDOH, ANN KARAGOZIAN, UCLA, VENKATESWARAN SANKARAN, Air Force Research Laboratory, CHARLES MERKLE, Purdue University — The design of optimal numerical schemes for subgrid scale (SGS) models in LES of reactive flows remains an area of continuing challenge. It has been shown that significant differences in solution can arise due to the choice of the SGS model's numerical scheme and its inherent dissipation properties, which can be exacerbated in combustion computations.[2] This presentation considers the individual roles of artificial dissipation, filtering,[3] secondary conservation[4] (Kinetic Energy Preservation), and collocated versus staggered grid arrangements with respect to the dissipation and dispersion characteristics and their overall impact on the robustness and accuracy for time-dependent simulations of relevance to reacting and non-reacting LES. We utilize von Neumann stability analysis in order to quantify these effects and to determine the relative strengths and weaknesses of the different approaches.

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[2]Cocks, Sankaran and Soterioiu, AIAA 2013-0170
[3]Kennedy and Carpenter, **App. Num. Math.**,14, 397-433, 1994
[4]Subbareddy and Candler, **J. Comp. Phys.**, 228,1347-1364, 2009

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