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Presentation Abstract Submission

Title:

Implicit Thermochemical Nonequilibrium Compressible Flow Simulations on Unstructured Grids Using GPUs

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Abstract:

As next-generation exascale-class systems arrive, existing software must be updated accordingly to effectively utilize these systems. For high concurrency and energy efficiency, many of these systems utilize GPU architectures. In this work, we present a CUDA C++ implementation of FUN3D's thermochemical nonequilibrium capability for turbulent flows. Efficiency is demonstrated at scale using the Summit system at the Oak Ridge Leadership Computing Facility which is representative of future exascale systems. This work enables faster, higher fidelity, and scale-resolving simulations of thermochemical nonequilibrium flows including reentry, hypersonics, and combustion.