Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Numerical simulations of sound propagation through clouds of rigid particles JOHN HAYWOOD, ADRIAN SESCU, EDWARD LUKE, Mississippi State University — The interaction between acoustic waves and particles suspended in a fluid are relevant to many present-day applications, for example propagation of sound through fog and dust, acoustic waves interaction with aluminum particles in rocket engines, or the injection of water particle to reduce jet noise. The focus will be on how the concentration and physical properties of the suspended particles influence the attenuation and dispersion of sound propagating through the surrounding fluid. High-fidelity numerical simulations will be performed utilizing the CHEM code which is a chemically-reacting Navier-Stokes finite-volume solver for generalized grids. Both the Eulerian and Lagrangian particle simulation approaches will be evaluated for their ability to model the interaction between rigid particles and acoustic waves in conjunction with the implemented fourth order low dissipation skew symmetric flux scheme. How sound-particle interactions are affected by the interface boundaries present in overset meshes will also be investigated.

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Date submitted: 10 Aug 2020 Electronic form version 1.4