

SAND2020-9179

**Title: ALEGRA/Sceptre Code Coupling**

**Brief: Researchers at Sandia have developed an advanced radiation hydrodynamic simulation capability by coupling the ALEGRA and Sceptre codes.**

The qualification of advanced system materials relies heavily on simulation to characterize the thermomechanical response of these materials to radiation environments. A new high-fidelity radiation hydrodynamic simulation capability has been developed by coupling the ALEGRA and Sceptre codes using an MPMD (multiple program, multiple data) methodology. This capability is the result of a multi-year collaboration between SNL radiation science and computer science staff. ALEGRA, a DoD, SNL NW and ASC funded shock and multi-physics code, and Sceptre, an ASC funded radiation transport code, combine over two decades of research and development of their respective core capabilities. The result is an advanced computational method for the simulation of complex multi-material problems that include photon/electron transport, ablation, shock, large deformation and material failure. This advanced capability enables future milestone research that will address surrogacy of experimental platforms for environmental response testing. (POC: Jason Sanchez [jassanc@sandia.gov](mailto:jassanc@sandia.gov), Shawn Pautz [sdpautz@sandia.gov](mailto:sdpautz@sandia.gov), James Overfelt [jroverf@sandia.gov](mailto:jroverf@sandia.gov) )

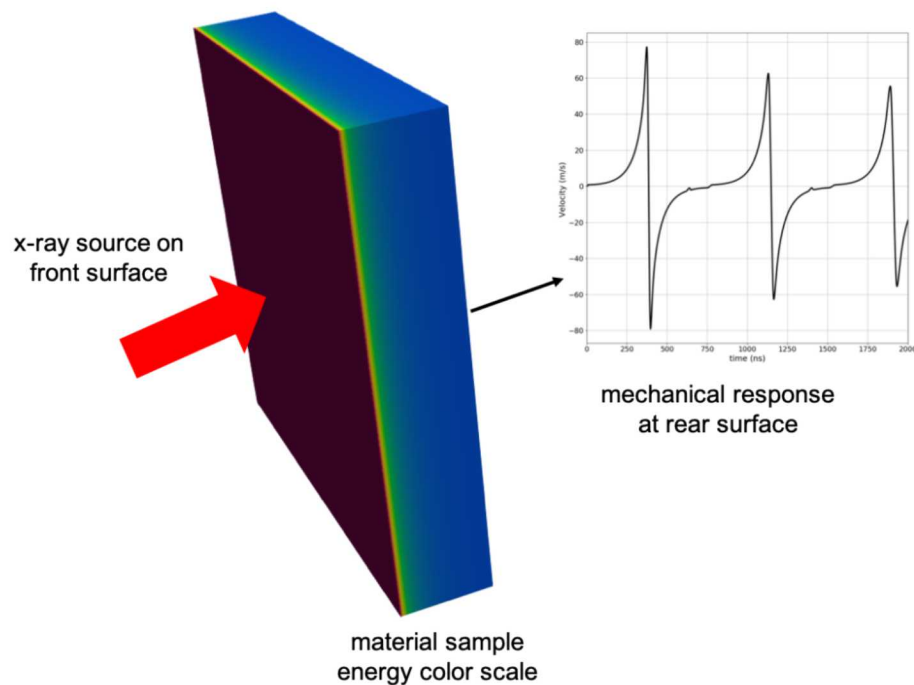


Figure: Thermomechanical response of a material sample exposed to an x-ray source



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