
Eric S. Myra
**Numerical Simulations of Radiation-Hydrodynamic
Systems: Challenges and Approaches**

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Radiation hydrodynamics is a field that encompasses a collection of exotic problems in exotic regimes. In this presentation, I will discuss multiphysics problems and iterative solution techniques for simulations of shock waves—both those in the laboratory and those of interest in an astrophysical setting. The systems of interest are complex, evolving, radiation-hydrodynamic, multiphysics environments with diverse distance scales, time scales, physical regimes, species, and radiation-matter couplings. The numerical models that result are of a scope that require large-scale parallel computing. Preconditioned Newton-Krylov methods are especially effective in making these problems computationally tractable.