Abstract Submitted
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Computational Efficiency and Parallelization Issues in ICF Calculations DAVID FYFE, Naval Research Laboratory — The advent of commodity cluster computers has put a premium on being able to map physics codes onto the computer hardware efficiently. Here we discuss the issues surrounding a distributed memory implementation of NRL's radiation transport code, FASTRAD3D. FASTRAD3D includes hydrodynamic transport, inverse Bremsstrahlung laser energy deposition, real equation of state through table lookup, implicit thermal diffusion, and a multi-group variable Eddington diffusion radiation transport model. Parallelization is accomplished through domain decomposition, but the data dependencies in some of the physics models can influence the type of domain decomposition. Load balancing issues arise in the implementation of the equation of state, where multi-material regions can take longer than single material regions. Implicit solvers and pre-conditioners associated with the elliptic solvers can impact the parallel efficiency. Finally, effective cache management can improve performance.

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