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Modeling many-beam laser plasma interactions using an adaptive paraxial scheme THOMAS CHAPMAN, LAURENT DIVOL, PIERRE MICHEL, RICHARD BERGER, Lawrence Livermore Natl Lab — Modeling the interaction of many laser beams in a hohlraum geometry via crossed-beam energy transfer (CBET) necessitates propagating beams with crossing angles surpassing 100 degrees. We demonstrate a modified paraxial scheme where many beams with large crossing angles may be propagated on a shared numerical grid, permitting efficient and accurate computation of energy exchange and polarization rotation due to CBET, diffraction, and refraction. Far-field boundary conditions are generated using numerical reproductions of experimentally characterized phase plates installed at the National Ignition Facility, allowing a faithful representation of the speckled laser spots. The numerical scheme adapts to the evolving direction of propagation of each beam, permitting beams to refract through large angles. We demonstrate laser beams undergoing “glint from the hohlraum wall, featuring a 100 degree change in beam propagation direction. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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