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Raytrace implementation for Polar Direct-Drive Targets[1] ANDREW J. SCHMITT, JASON BATES, Naval Research Laboratory, DAVID EIMERL, Eimex Software and Consulting — An accurate description of laser light propagation in the underdense corona of inertial fusion targets is needed to properly calculate both the distribution and uniformity of the laser deposition, which determines the drive pressure. This is particularly important for asymmetric illumination scenarios such as polar direct-drive on the NIF. The customary way of handling light propagation and deposition involves solving the equations of geometrical optics for individual rays in each laser beam, then depositing the absorbed laser energy along the ray trajectory. One problem with raytracing is the noise generated by the deposition of inherently 1-dimensional rays. Either very large numbers of rays are used (smoothing as $\sim N_{rays}^{1/2}$) or artificial smoothing is needed. The former requires excessive computation time, while the latter can eliminate the desired nonuniformity structure. In our new implementation of 3D raytracing in the MPI-parallel FAST hydro code, we are exploring a new approach that increases the speed of the raytracing while reducing the deposition noise. We will review this approach, describe our progress, and apply the techniques to problems of polar direct-drive target design.

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