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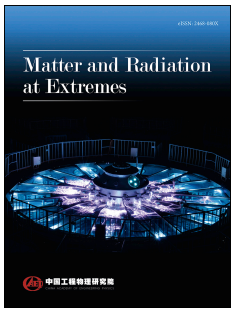

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Optimization of laser illumination configuration for directly driven inertial confinement fusion

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Abstract

Optimum laser configurations are presented to achieve high illumination uniformity with directly driven inertial confinement fusion targets. Assuming axisymmetric absorption pattern of individual laser beams, theoretical models are reviewed in terms of the number of laser beams, system imperfection, and laser beam patterns. Utilizing a self-organizing system of charged particles on a sphere, a simple numerical model is provided to give an optimal configuration for an arbitrary number of laser beams. As a result, such new configurations as "M48" and "M60" are found to show substantially higher illumination uniformity than any other existing direct drive systems. A new polar direct-drive scheme is proposed with the laser axes keeping off the target center, which can be applied to laser configurations designed for indirectly driven inertial fusion.

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Keywords: analytical model, laser illumination design, polar direct drive

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