

Abstract Submitted
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The Shaped Critical Surface in High Intensity Laser-Plasma Interactions¹ G. ELIJAH KEMP, DOUGLASS W. SCHUMACHER, ANTHONY J. LINK, RICHARD R. FREEMAN, LINN D. VAN WOERKOM, The Ohio State University — The interaction between an intense laser and under-dense plasma involves relativistic effects and instabilities that can drastically alter pulse properties. Characterization of the plasma, particularly the density profile, is paramount in understanding what effects dominate. Simulations of the reflection of light off of plasma show that the formation of the relativistically shaped critical surface, dependent on both the laser intensity and plasma density profiles, plays an important role in the divergence of the specularly reflected light. We have found that these effects can be modeled as a simple problem in Gaussian optics, with the plasma acting as a combination of lenses and mirrors. This work suggests that by measuring the divergence of the specularly reflected light, the plasma density profile can be determined in regions where shadographic and interferometric techniques are limited.

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