Abstract Submitted
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Using K_α images to measure pre-plasma and electron refluxing in intense laser experiments[1] V.M. OVCHINNIKOV, D.W. SCHUMACHER, L.D. VAN WOERKOM, K.U. AKLI, R.R. FREEMAN — We report the first use of the *spatial structure* of time-integrated K_α images to *quantitatively* characterize the pre-plasma profile near the critical surface and to verify unambiguously the near elimination of back-surface refluxing from targets when a thick layer of a low-Z material is attached to the back. The simulated K_α images are found to be sensitive to the pre-plasma scale length (the only free parameter in our simulations), permitting the pre-plasma profile to be determined by fitting to experimental results. Based on this "preplasma diagnostic", two experiments from the Titan laser at LLNL were benchmarked with the LSP simulations which allowed extracting the scale lengths for the preplasma conditions that existed at the time of the experiment. We also find that electron beam divergence angle has a linear dependence on the preplasma scale length and it increases by approximately 8 degrees per every micrometer of the preplasma scale length in the 1-5 μm scale length range.

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