Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Mitigating the hosing instability in relativistic laser-plasma interactions LUKE CEURVORST, NAREN RATAN, MATTHEW LEVY, MUHAMMAD KASIM, JAMES SADLER, University of Oxford, ROBBIE SCOTT, RAOUL TRINES, TAIWU HUANG, STFC Rutherford Appleton Laboratory, MARIJA SKRAMIC, University Cambridge, MARIJA VRANIC, LUIS SILVA, Instituto Superior Tecnico, PETER NORREYS, University of Oxford — A new physical model of the hosing instability that includes relativistic laser pulses and moderate densities is presented and derives the density dependence of the hosing equation. This is tested against two dimensional particle-in-cell simulations. These simulations further examine the feasibility of using multiple pulses to mitigate the hosing instability in a Nd:glass-type parameter space. An examination of the effects of planar versus cylindrical exponential density gradients on the hosing instability is also presented. The results show that strongly relativistic pulses and more planar geometries are capable of mitigating the hosing instability which is in line with the predictions of the physical model.

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Date submitted: 24 Jul 2015 Electronic form version 1.4