

Abstract Submitted
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Development of Ion Wave Plasma Optics for NIF and Other Lasers.¹ R. K. KIRKWOOD, P. L. POOLE, D. H. KALANTAR, T. D. CHAPMAN, S. C. WILKS, M. R. EDWARDS, P. MICHEL, L. DIVOL, LLNL, N. FISCH, Princeton, P. NORREYS, Oxford, W. ROZMUS, Univ. Alberta, J. BUDE, B. E. BLUE, K. B. FOURNIER, B. M. VAN WONTERGHEM, LLNL — The success of combining beam energies and increasing fluences on target with an ion wave plasma optic produced by Cross Beam Energy Transfer (CBET) [1,2,3] motivates its development for new applications. It has been shown that the linear plasma response observed in present plasma optics [4] would allow a 1 ns, high energy plasma-combined beam to act as a pump for a second stage of amplification and compression of a $< \sim 0.1$ ns seed beam [5] if non-linear plasma wave effects remain benign. However the suppression of secondary instabilities dictates that the 15 cm plasma in such a compressor be very low density ($< \sim 0.1\%$ crit. [5]) to allow highest performance, which pushes it into a regime where particle trapping and other non-linear effects are also important. Recent and planned simulations and the existing and planned experiments that can benchmark them will be discussed, as will potential applications ranging from radiography to fusion energy. [1] P. Poole in preparation, [2] R. K. Kirkwood et al Nat. Phys. 14, 80 (2018). [3] R. K. Kirkwood et al Phys. of Plas. 25 056701 (2018). [4] A Colaitis et al Physics of Plasmas 25, 033114 (2018), [5] R. K. Kirkwood et al, APS DPP 2019.

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