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Ion Wave Plasma Optic Concepts for NIF and Other Lasers ¹ ROBERT KIRKWOOD, P. L. POOLE, T. D. CHAPMAN, S. C. WILKS, P. MICHEL, L. DIVOL, Lawrence Livermore Natl Lab, N. J. FISCH, Princeton, P. NORREYS, Oxford, W. ROZMUS, University of Alberta, J. BUDE, B. E. BLUE, B. M. VAN WONTERGHEM, Lawrence Livermore Natl Lab — Recent demonstrations at NIF of plasma optics produced with ion waves driven by Cross Beam Energy Transfer (CBET) [1,2,3] have motivated work to develop concepts for similar optics to enhance laser performance at NIF and other laser facilities. The success of CBET models based on the linear response of ion waves in plasmas with minimal inverse Bremsstrahlung absorption [3,4], now motivates their use to design new plasma optics to produce beams with high performance in other respects, including: a beam combiner transferring energy to a beam with reduced focal spot size, a short pulse amplifier that transfers the power from many 1 ns beams to a single beam with <0.1ns duration, and a pulse compressor that uses a plasma combined pump with >40 kJ in 1ns compressed to a duration of 10 to 100 ps in a second stage of interaction in a ~15 cm plasma. The challenges associated with designing and fielding such optics at NIF and elsewhere, as well as the requirements plasma optics place on new or upgraded facilities will be discussed to identify the most promising concepts. [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)

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