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Kinetic Modelling of CBET Mitigation Using Laser Bandwidth¹

A. G. SEATON, L. YIN, Los Alamos National Laboratory, Los Alamos NM, 87544, RUSSELL FOLLETT, Laboratory for Laser Energetics, University of Rochester, Rochester, NY 14623, A. Y. LE, B. J. ALBRIGHT, Los Alamos National Laboratory, Los Alamos NM, 87544 — In the context of direct-drive inertial confinement fusion (ICF), it has been acknowledged that the levels of cross-beam energy transfer (CBET) found in current experiments would likely preclude ignition in a full-scale shot[1]. In experiments on the OMEGA laser, CBET reduces laser-target coupling by up to 30%[2], with even higher losses on the NIF[1]. Increased laser driver bandwidth offers a promising route to mitigate CBET and other laser-plasma instabilities, which would allow for a significant expansion of the ICF design space. Here we present VPIC[3] particle-in-cell simulations investigating the efficacy of bandwidth in reducing CBET. We compare the PIC results with linearized fluid simulations performed with the LPSE code[4] and discuss the significance of nonlinear kinetic and fluid effects and their response to bandwidth. [1] V. N. Goncharov et al. (2017). *Plasma Physics and Controlled Fusion*, 59(1), 014008. [2] I. V. Igumenshchev et al. (2010). *Physics of Plasmas*, 17(12), 2126. [3] K. J. Bowers et al. (2008). *Physics of Plasmas*, 15(5), 055703. [4] J. F. Myatt et al. (2019). *Journal of Computational Physics*, 399, 108916.

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