Abstract Submitted
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Nonlinear saturation of cross beam energy transfer[1] KHANH LINH NGUYEN, Laboratory for Laser Energetics, LIN YIN, BRIAN ALBRIGHT, Los Alamos National Laboratory, AARON HANSEN, DAVID TURNBULL, RUSSELL FOLLETT, DUSTIN FROULA, JOHN PALASTRO, Laboratory for Laser Energetics, LABORATORY FOR LASER ENERGETICS TEAM, LOS ALAMOS NATIONAL LABORATORY COLLABORATION — The performance of laser-driven inertial confinement fusion (ICF) implosions relies critically on the coupling of laser energy to the target plasma. Cross beam energy transfer (CBET), the resonant exchange of energy between overlapped beams mediated by ponderomotively excited ion-acoustic waves, inhibits this coupling by scattering light into unwanted directions. Here, we show that CBET can saturate through a resonance detuning that results from modifications to the velocity distribution functions due to trapping in the ion-acoustic wave. Particle-in-cell simulations of Tunable OMEGA Port 9 (TOP9) experiments at the Laboratory for Laser Energetics exhibit an initial stage of saturation in which ion-acoustic waves undergo transverse breakup [1]. This is followed by a second longer time scale saturation due to modified distribution functions. Results from these simulations can inform the reduced CBET models implemented in radiation hydrodynamics simulations, improving their predictivity capability, and reveal pathways towards CBET mitigation. 1. L. Yin et al. Phys. Plasmas 26, 082708 (2019).

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