Abstract Submitted
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Implementation and Optimization of a Plasma Beam Combiner at NIF R.K. KIRKWOOD, D.P. TURNBULL, R.A. LONDON, S.C. WILKS, P.A. MICHEL, W.H. DUNLOP, J.D. MOODY, B.J. MACGOWAN, K.B. FOURNIER, LLNL — The seeded SBS process that is known to effectively amplify beams in ignition targets [1] has recently been used to design a target to combine the power and energy of many beams of the NIF facility into a single beam by intersecting them in a gas [2]. The demand for high-power beams for a variety of applications at NIF makes a demonstration of this process attractive. We will describe the plan for empirically optimizing a combiner that uses a gas-filled balloon heated by 10 quads of beams, and pumped by 5 additional frequency-tuned quads to amplify a single beam or quad. The final empirical optimization of beam wavelengths will be determined by using up to three colors in each shot. Performance and platform compatibility will also be optimized by considering designs with a CH gas fill that can be fielded at room temperature as well as a He gas fill to minimize absorption in the combiner. The logic, diagnostic configuration, and backscatter risk mitigation from two shots presently planned for NIF will also be described. This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

[1] R. K. Kirkwood et al Plasma Phys. Controlled Fusion 55, 103001 (2013).
[2] R. K. Kirkwood et al APS DPP 2012.

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