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Experimental demonstration of optical mitigation techniques for simulated backscatter in ignition relevant plasmas D.H. FROULA, L. DIVOL, T. DOEPPNER, R. LONDON, R. BERGER, P. MICHEL, S. DIXIT, J.S. ROSS, P. NEUMAYER, N. MEEZAN, L. SUTER, S.H. GLENZER, LLNL — Inertial confinement fusion and high-energy density physics experiments require intense and energetic laser beams to propagate efficiently through long plasmas. A series of experiments performed at Omega will be presented that study the effects of smoothing by spectral dispersion (SSD) and polarization smoothing on the mitigating of both stimulated Brillouin scattering (SBS) and stimulated Raman scattering. We measure a factor of 1.7 reduction in the backscatter when polarization smoothing is applied; no effect on the SBS is observed when SSD with 3 Å bandwidth is applied. An analytical model relevant to inertial confinement fusion plasma conditions shows that the measured reduction in backscatter is not a result of the reduction in beam contrast, but a result of the fact that, on average, only one of the polarizations is amplified over a speckle length at a given transverse location. The results from these experiments compare well to linear theory as modeled in 3 dimensions by pf3D. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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