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Aggregate model of backward stimulated Raman scattering in a random-phase-plate smoothed laser beam[1] B.J. ALBRIGHT, LANL, W. DAUGHTON, U. of Iowa, LIN YIN, Q. ROPER, K.J. BOWERS[2], J.L. KLINE, D.S. MONTGOMERY, J.C. FERNÁNDEZ, LANL — Single-hot-spot experiments allow studies of dynamics in media that resemble hot spots of random-phase-plate (RPP) smoothed inertial confinement fusion (ICF) beams. Recently, a parametric coupling involving backward stimulated scattering of a laser and electron beam acoustic modes (BAM) has been described by theory and is observed in particle-in-cell (PIC) simulations where rapid increases in reflectivity with intensity occur with the emergence of BAM modes. This scaling is similar to that observed in the LANL Trident experiments. In this presentation, a discrete model is presented of the aggregate effects of a RPP-smoothed laser beam in which the individual elements are correlation lengths of the random laser field. The model is calibrated to reflectivities from 1D and 2D PIC simulations. In the linear gain regime, the backscatter intensity obeys a power-law. In long or strongly driven systems, nonlinear saturation ensues.

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