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Stimulated backscatter in a speckled laser beam[1] EDWARD WILLIAMS, LAURENT DIVOL, LLNL — High power lasers used for laser-plasma interaction experiments are commonly equipped with phase plates, which create high intensity speckles in their far field. Independent speckle models for stimulated backscatter have been proposed in which the reflectivity is determined by a convolution over the speckle intensity distribution. Such models might apply when the resonant amplification region extends over no more than a characteristic speckle length. By a variational approach, we show how these results are modified if the amplification region extends over multiple speckle lengths, reducing the contrast of the effective intensity distribution, thereby narrowing the distribution of spatial gains. For SBS, the phase conjugate mode grows at twice the average spatial growth rate. It can dominate over the other modes if the higher growth can overcome the small mode fraction. We compare these analytic estimates with those obtained from our parallel laser-plasma interaction code SLIP which solves the steady state mode coupling equations in 3D.

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