

Abstract Submitted
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Cooperative stimulated Brillouin scattering driven by overlapping, large spot laser beams¹ WILLIAM KRUER², ROBERT KIRKWOOD, PIERRE MICHEL, DAVID TURNBULL, Lawrence Livermore National Laboratory — In NIF hohlraums, large regions of plasma are irradiated with intense overlapping and large spot laser beams. In this regime, cooperative excitation of stimulated scattering can become a significant effect. Indeed, the potential importance of cooperative scattering has already been illustrated in calculations [1] of cross beam energy transfer, where many crossing laser beams enhance the energy of another beam- a form of (generally nonresonant) cooperative SBS in the forward direction. Similarly, cooperative interactions are thought to play some role in scattering in the backward direction [2,3]. Here we consider an interesting special case in which all the beams in a cone resonantly drive an ion sound wave along the hohlraum axis. This results in laser light being scattered backward along the cone. The frequency of this scattered light differs from that of the light directly backscattered by each beam, although there may be cross talk if the frequency of the backscattered light is sufficiently broad. A simple theory is presented, and some experiments to isolate and characterize cooperative scattering are discussed.

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