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PIC Simulations of Stimulated Raman Scattering Due to Interacting Laser Speckles[1] W.B. MORI, B.J. WINJUM, F.S. TSUNG, (UCLA) — The laser beams in inertial confinement fusion experiments consist of a distribution of high-intensity speckles, a percentage of which are above-threshold for stimulated Raman scattering (SRS). SRS can also be driven in below-threshold speckles due to inter-speckle interactions via waves and particles. We present 2D PIC simulations with the code OSIRIS showing conditions for which scattered light waves, plasma waves, and hot electrons generated in above-threshold speckles drive SRS in neighboring, below-threshold speckles. Through tailored two-speckle simulations in which we control the relative placement and polarizations of the speckles, we isolate inter-speckle SRS driven by each of these three intermediary elements. Scattered light is the most efficient mechanism for inter-speckle SRS, though all three can stimulate SRS in below-threshold speckles. We also present simulations of multi-speckle ensembles illustrating differences in plasma wave activity and reflectivity levels when the polarizations are not all uniform, limiting interactions via scattered light.

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