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Saturation of backward stimulated Raman scattering in kinetic regime: Wavefront bowing and trapped particle self-focusing of electron plasma waves L. YIN, B.J. ALBRIGHT, K.J. BOWERS, W. DAUGHTON, H.A. ROSE, Los Alamos National Laboratory — Backward stimulated Raman scattering (SRS) in a single laser speckle is examined in the kinetic regime using 2D/3D PIC simulations. Wavefront bowing of electron plasma waves due to trapped electron nonlinear frequency shift and amplitude-dependent damping is observed under both NIF and Trident experimental conditions. This is followed by the trapped particle modulational instability which evolves nonlinearly into self-focusing. Self-focusing leads to rapid transverse electron plasma wave phase variation and increased rate of loss of trapped electrons and subsequent increase of damping. In 3D this electron plasma wave turbulence may also exhibit loss of angular coherence by formation of a filament necklace, a process not possible in 2D. This reduction of electron plasma wave coherence, and hence reduction of source coherence for backscattered light, and increased damping, fundamentally limit how much backscatter can occur in a laser speckle. (KJB: Guest Scientist. Currently with D. E. Shaw Research, LLC, New York, NY 10036.)

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