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The nonlinear evolution of driven nonlinear ion acoustic waves with kinetic electrons RICHARD BERGER, Lawrence Livermore National Laboratory, STEPHAN BRUNNER, CRPP, EPFL, Lausanne, Switzerland, ERNEST VALEO, Princeton Plasma Physics Laboratory, Princeton, NJ, LAURENT DIVOL, CHARLES STILL, Lawrence Livermore National Laboratory — The stimulated Brillouin scattering (SBS) of laser light from hot plasma drives ion acoustic waves to large amplitudes particularly if the phase velocity is much greater than the ion thermal velocity for all ion species, that is, ZTe/Ti >>1 where Z is the charge state of the ion, and T_e and T_i are the electron and ion temperatures. In fluid simulations of the SBS from CO_2 and Krypton plasmas, *ad hoc* limits on the amplitude of the driven ion waves were required to match the measured reflectivity. Because $ZT_e/T_i >>1$, ion kinetics are unlikely to play a role in the saturation of ion waves. Here, we study the effect of electron trapping which produces a positive frequency shift in quantitative agreement with theory (see abstract by S. Brunner *et al.*, this meeting) and the role of electron kinetics on the decay instability of the driven ion wave. Further, we apply these results to modeling of experiments where $ZT_e/T_i >>1$ [*e.g.*, Glenzer *et al.,* PRL **86**, 2565 (2001), L. Divol, et al., Physics of Plasmas **10**, 1822 (2003)].

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