Abstract Submitted
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A PIC simulation study of non linear frequency shift and damping rate of 1D plasma waves[1] THOMAS GRISMAYER, BENJAMIN WINJUM, JAY FAHLEN, FRANK TSUNG, GEORGE MORALES, WARREN MORI — Recently much interest has been devoted to non linear plasma waves. Here we address the 1D electrostatic PIC simulations of the non linear effects associated with the evolution of impulse excited plasma waves in the kinetic regime ($k\lambda_D \geq 0.3$). The simulation results are in reasonable agreement with the transient and asymptotic theoretical predictions (non linear Landau damping and frequency shift) of Morales and O'Neil for parameters where their theory is appropriate. Furthermore, the strength in which the theory holds is tested by varying the parameters outside of the range of validity. Classical non linear effects such as sideband instabilities, damping rate of high amplitude plasma waves and BGK modes will also be discussed. In addition, we will consider the effects of small numbers of resonant particles.

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