

Abstract Submitted  
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**Self-interactions of electron Bernstein waves in an inhomogeneous plasma**<sup>1</sup> NONG XIANG, JOHN R. CARY<sup>2</sup>, CIPS, University of Colorado, DANIEL C. BARNES, CIPS, University of Colorado, JOHAN CARLSSON, Tech-X Corporation — The nonlinear dynamics of the electron Bernstein waves in the X- B mode conversion is simulated via both the  $\delta f$  and full particle-in-cell (PIC) simulations. It is shown that the nonlinear self-interaction of the electron Bernstein wave (EBW) can give rise to the second harmonic generation at a pump power as low as three orders smaller than the electron thermal energy. The theory describing this nonlinear wave coupling in an inhomogeneous plasma is obtained and is compared to the simulations. It is found that the amplitude of the second harmonic EBW excited can exceed that of the fundamental wave if the field of the fundamental EBW is sufficiently strong. With a high incident power, the generations of the non-propagation third and fourth harmonic modes are also observed.

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