

Electrostatic instabilities induced by large-amplitude left-hand polarized waves

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We study the effect of a large-amplitude left-hand polarized wave on ion acoustic instabilities. We show that the presence of a finite amplitude left-hand polarized wave produces electrostatic instabilities above a threshold amplitude. These instabilities occur when the phase velocities of the counter-streaming ion acoustic waves become equal, due to the action of the nonlinear wave. They do not exist in the absence of large-amplitude waves. We examine their growth rates and threshold amplitude behavior as a function of the beam speed, temperature, and large-amplitude wave frequency. Copyright 2004 by the American Geophysical Union.