

THE EFFECT OF NEGATIVE IONS ON WEIBEL INSTABILITY IN THE PRESENCE OF LARGE AMPLITUDE ELECTROSTATIC WAVES

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Abstract. In the present manuscript, the effect of a large amplitude Langmuir wave on the Weibel instability in the presence of negative ions with an electron beam is studied. The electromagnetic (EM) perturbation couples with the Langmuir wave and give rise two Langmuir side bands and the Langmuir wave enhanced the growth rate over its linear value. The growth rate scales as one half power of the beam velocity and in the presence of negative ions the growth rate is calculated. Here, the author observed that the growth rate of Weibel instability strongly depends on plasma frequency of negative ions. Our theoretical work may find applications in the astrophysical plasmas, laboratory plasmas, laser produced plasmas, microwave breakdown of dilute gases, energy transportation etc. Our work can be used for generation of magnetic field in space, supernovas and galactic cosmic rays also.

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