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**Perturbed Density Patterns during Microwave and Plasma Interaction in a Rectangular Waveguide** SANJAY TOMAR, Indian Institute of Technology Delhi, HITENDRA MALIK — The interaction of electromagnetic waves and plasma has been an active and interesting field of research due to its diverse applications in controlled fusion applications (ITER), particle acceleration, frequency upshifting, resonance absorption, etc. In our recent study, we have observed interesting structures of the perturbed density due to the effect of microwave ponderomotive force when the fundamental  $TE_{10}$  mode encounters a plasma in a waveguide. Now in the present investigation, we examine the microwave and plasma interaction in a rectangular waveguide when the two fundamental  $TE_{10}$  modes superpose and encounter a plasma in another waveguide of the same size. Here, we explore the importance of phase difference between these two modes. Moreover, in view of the possible applications of high intensity microwaves to ITER, we study the effects of different parameters on the plasma density profile as well on the wavelength of the microwave. For this, we not only consider the homogeneous plasma but initial density is also taken to be linearly varying in the propagation direction and Gaussian distribution along the waveguide width. For each case, we have also analyzed the perturbed plasma density profile for the different temperature of the electrons in the plasma, which gives some interesting results.

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