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Instabilities for a relativistic electron beam interacting with a laser-irradiated plasma HRACHYA B. NERSISYAN, Inst.Radiophys. Ashatarak, CLAUDE DEUTSCH, LPGP UParis-Sud, REBINSTA COLLABORATION — The effects of a radiation field(RF) on the unstable modes developed in a relativistic beam-plasma interaction are investigated assuming a RF frequency > electron plasma frequency. These unstable modes are parametrically coupled to each other due to the RF and show up as a mix between 2-stream and parametric instabilities. The dispersion equations are derived by linearization of kinetic equations for a beam-plasma system as well as by the Maxwell equations [1]. We present a comparison of our analytical and numerical results obtained for nonzero RF with those for vanishing RF. Assuming that the drift velocity Ub is parallel to the wave vector k of the excitations, two specific transverse and parallel configurations of the polarization vector E0 of the RF w.r.t k are considered. In both geometries, resonant and nonresonant couplings between different modes are likely to occur. Largest growth rates are expected at transverse configuration when E0 is perpendicular to k. The spectrum of unstable modes in the Omega-k plane is split into two distinct domains at long and short wavelenths, where unstable modes are sensitive to beam or RF parameters, respectively.

[1] H.B. Nersisyan and C. Deutsch, Phys. Rev. E85, 056414 (2012)

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