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Weibel instability in relativistic electron positron plasma. ZAHIDA EHSAN, COMSATS Institute of Information Technology, Lahore 54000, Pakistan., NODAR TSINTSADZE, Faculty of Exact and Natural Sciences and Andronicashvili Institute of Physics, Javakhishvili Tbilisi University,Tbilisi 0128, Georgia, PETER YOON, IPST, University of Maryland, College Park, MD 20742-2431, USA — We consider a situation in when the interaction of relativistically intense EM waves with an isotropic electron positron? plasma takes place, i.e., we consider short pulse lasers with intensity up to 10^{21} W/cm^2, in which the photon density is of the order of 10^{30}cm^{-3} and the strength of electric field E = 10^9 statvolt/cm. Such a situation is possible in astrophysical and laboratory plasmas which are subject to intense laser radiation, thus leading to nonthermal equilibrium field radiations. Such interaction of the superstrong laser radiation with an isotropic pair plasma leads to the generation of low frequency electromagnetic EM waves and in particular a quasistationary magnetic field. When the relativistic circularly polarized transverse EM wave propagates along z-axis, it creates a ponderomotive force, which affects the motion of particles along the direction of its propagation. On the other hand, motion of the particles across the direction of propagation is defined by the ponderomotive potential. Moreover dispersion relation for the transverse EM wave using a special distribution function, which has an anisotropic form, is derived and is subsequently investigated for a number of special cases. In general, it is shown that the growth rate of the EM wave strongly depends upon its intensity.

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