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Interplay of collisions with quasilinear growth rates of relativistic e-beam driven instabilities in a superdense plasma C. DEUTSCH, P. FROMY, UParis XI, Orsay, France, A. BRET, UCastilla-Mancha, CiudadReal, Spain, M.C. FIRPO, Ecole Polytechnique, Palaiseau, France — We focus attention on the rapidly growing electromagnetic (EM) instabilities arising in the interaction of intense and relativistic electron beams (REB) with supercompressed thermonuclear fuels. REB-target system is taken neutral in charge and current with a distribution function featuring beam and target temperatures. The EM filamentation (Weibel) instability is first considered in a linear approximation. Relevant growth rates then highlight density beam/target density ratio and beam transverse temperature. Significant refinements include mode-mode coupling and collisions with target electrons. The former qualify the quasilinear and weakly turbulent approach. Usually, it yields significantly lower growth rates than linear ones. Collisions enhance them slightly for small wavenumber k and damp them strongly at large k. In a low temperature target plasma, intrabeam scattering also contributes to instability taming while keeping it close to zero in a warm plasma. Our parameters study provides further support to the cone-angle (Osaka experiment) configuration with REB penetrating close to the compressed fuel dense core.

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