Abstract Submitted
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How the Weibel instability of a beam/plasma system works O. POLOMAROV, A. SOLODOV, R. BETTI, Laboratory for Laser Energetics and FSC, U. of Rochester, I. KAGANOVICH, PPPL, Princeton, G. SHVETS, U. of Texas at Austin — The linear and non-linear stages of the collisionless and collisional electromagnetic Weibel instability (WI) are considered analytically by the two-fluid hydrodynamic model and numerically by PIC simulations [1, 2]. Conditions for the saturation of the linear and non-linear stages of the instability are distinguished and analyzed. The self-sustained beam and return current structures created by the collisionless Weibel instability at long times are presented. The role of Alfven current for the collisionless and collisional WI instability is pointed out and the increase/decrease of the magnetic field generated by the WI is related to the merging of filaments with the sub/super-Alfvenic beam currents. Transition from collisionless to collisional regimes of the WI with accompanying changes of the instability scales is considered and the influence of the plasma density gradient and beam/plasma temperatures on the development of the instability is studied.
[1] O. Polomarov et al., Phys. Plasmas, **14**, 043103 (2007)
[2] O. Polomarov et al., PRL (2008) submitted.

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