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PIC simulations of Weibel instability and its spectral studies[1]
MICHAEL SITARZ, University of Kansas, MIKHAIL MEDVEDEV, University of Kansas and MIT, ALEXANDER PHILIPPOV, CCA, Flatiron Inst. — The Weibel instability is ubiquitous in astrophysical plasmas, which are present in collisionless shocks, early state of supernovae and gamma-ray bursts, and others. This instability generates strong magnetic fields from scratch. The generated electromagnetic fields reside on the plasma skin-depth scale, which is smaller than the effective Larmor scale. Radiation from such sub-Larmor-scale fields, known as the jitter radiation, markedly differs from the cyclotron or synchrotron radiation. Its spectrum carries wealth of information about the magnetic field properties. Here we present the spectral studies the Weibel instability with PIC simulations. The generation of high-frequency electromagnetic fluctuations is observed. The resultant spectrum, its temporal and angular distribution of the emitted power are discussed.

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