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Radiation production in Weibel-generated magnetic fields in relativistic astrophysical shocks[1] SARAH REYNOLDS, MIKHAIL MEDVEDEV, University Of Kansas — Radiation produced by charged relativistic particles undergoing small randomly-oriented accelerations correlated on a sub-Larmor scale is referred to as the Jitter radiation. It is emitted from small-scale turbulent electromagnetic fields, such as those generated in relativistic collisionless shock fronts of gamma-ray bursts (GRBs) and in Petawatt-scale laser-produced plasmas by the Weibel instability. The spectral characteristics of jitter radiation are distinct from the synchrotron case and intimately related to the magnetic field spectrum at small scales. Conventionally, in the Jitter regime, the particle deflections are considered to be smaller than the relativistic beaming angle of $1/\gamma$ (γ being the Lorentz factor of an emitting particle) and the particle distribution is assumed to be isotropic. Here we relax both assumptions and present the extension of the jitter theory amenable for comparisons with experimental data. We demonstrate the spectral sensitivity to anisotropy in the Weibel-generated magnetic field orientation. We also discuss applications to laboratory studies of the Weibel instability and to certain astrophysical phenomena.

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