

Abstract Submitted
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“Pseudo-cyclotron” radiation of non-relativistic particles in small-scale magnetic turbulence¹ BRETT KEENAN, ALEX FORD, MIKHAIL V. MEDVEDEV, U. Kansas — Plasma turbulence in some astrophysical objects (e.g., weakly magnetized collisionless shocks in GRBs and SN) has small-scale magnetic field fluctuations. We study spectral characteristics of radiation produced by particles moving in such turbulence. It was shown earlier that relativistic particles produce jitter radiation, which spectral characteristics are markedly different from synchrotron radiation. Here we study radiation produced by non-relativistic particles. In the case of a homogeneous fields, such radiation is cyclotron and its spectrum consists of just a single harmonic at the cyclotron frequency. However, in the sub-Larmor-scale turbulence, the radiation spectrum is much richer and reflects statistical properties of the underlying magnetic field. We present both analytical estimates and results of *ab initio* numerical simulations. We also show that particle propagation in such turbulence is diffusive and evaluate the diffusion coefficient. We demonstrate that the diffusion coefficient correlates with some spectral parameters. These results can be very valuable for remote diagnostics of laboratory and astrophysical plasmas.

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