

Abstract Submitted
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Relation of the energy and pitch-angle diffusion of charged particles to the emitted radiation in small-scale astrophysical turbulence¹

BRETT KEENAN, ALEX FORD, MIKHAIL MEDVEDEV, Univ of Kansas — Plasma turbulence in some energetic astrophysical objects, such as weakly magnetized collisionless shocks in GRBs and SN, has intense fluctuations at very small scales. We investigate the relation of the characteristics of radiation produced by charged particles (relativistic through non-relativistic) moving in such turbulence and relate it to the diffusion of these particles in the velocity/energy space. We demonstrate that in contrast to the case of homogeneous B-field, radiation in the sub-Larmor-scale and rapidly fluctuating turbulence reflects statistical and temporal properties of the underlying electromagnetic fields. Both analytical estimates and the results of *ab initio* numerical simulations will be presented. We also confirm that particle propagation in such turbulence is diffusive. We evaluate the diffusion coefficients in the velocity space and demonstrate strong coupling of transport and radiation properties, which can be very valuable for remote diagnostics of astrophysical plasmas.

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Mikhail Medvedev
Univ of Kansas

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