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Inter-relation of radiative and transport properties of HED plasmas with small-scale magnetic turbulence[1] B. KEENAN, M.V. MEDVEDEV, University of Kansas — Instabilities and dissipation mechanisms for relativistic beams are of central importance to laboratory plasmas, where they can affect the efficiency of the wake field acceleration and defeat the ignitor scheme. Kinetic streaming instabilities are also dominant processes in astrophysical plasmas, e.g., in relativistic collisionless shocks. It has earlier been proposed that radiation emitted by relativistic electrons, called jitter radiation, during the field generation and its subsequent self-similar evolution and self-organization can deliver wealth of information about the internal structure of "Weibel turbulence." The small-scale fields simultaneously affect the particle transport via pitch-angle diffusion and the radiation production and its spectra. Both effects are related and can be used to diagnose the plasma state. Indeed, the radiation pattern is intimately related to the particle orbits and, thus, to the transport properties of the turbulence. We study such a relation between transport and radiation in sub-Larmor-scale turbulence numerical simulations and analysis. Our results will improve the radiative diagnostic technique of lab and astro HED plasmas.

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