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**Radiative diagnostics for sub-Larmor scale magnetic turbulence**[1]
S.J. REYNOLDS, M.V. MEDVEDEV, U.Kansas — The radiation produced by particles moving through small-scale magnetic field turbulence, such as may be produced in laser-plasma instabilities, relativistic collisionless shocks, and reconnection outflow, can be used to analyze the features of the magnetic field distribution in such regions. Particles propagating through such turbulence encounter locally strong magnetic fields, but over lengths much shorter than a particle gyroradius (that is, $lambda_B \ll \gamma mv/q\langle B_\perp \rangle$). Consequently, the particle is accelerated but not deviated substantially from a straight line path. We develop the general jitter radiation solutions for this case and show that the resulting radiation is directly dependent upon the spectral distribution of the magnetic field through which the particle propagates. We demonstrate the power of this approach in considering the radiation produced by particles moving through a region in which a (Weibel-like) filamentation instability grows magnetic fields randomly oriented in a plane transverse to counterstreaming particle populations. We calculate the spectrum as would be seen from the original particle population and as could be seen by using a quasi-monoenergetic electron beam to probe the turbulent region at various angles to the filamentation axis.

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