

Ultrastrong Magnetic Fields Enhancing Laser-Produced Gamma-Photon Emission

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We study the electron motion within an ultrastrong laser field plus a constant magnetic field. The effect of the radiation reaction force is also considered. Particle-in-cell simulations extend the single-electron analysis into a more realistic system, where the gamma-photon spatial and spectral characteristic are revealed. When the external magnetic field is orthogonal to the laser propagation axis, then the laser to photon energy conversion efficiency is enhanced. Moreover, when the constant magnetic field aligns with the laser field then the gamma-photons are emitted on a disk-like distribution, thus increasing the peak gamma-ray radiant intensity by several times.