

Effective Field Theory and High-intensity Laser Experiment

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High-intensity laser are close to becoming a new resource high-energy particles and radiation studies. The Texas Petawatt laser produces 100 MeV-2 GeV electrons and recently demonstrated high-flux highly-collimated 10-70 MeV photons. The challenge is reliably predicting the energy and distribution of emitted photons, because both classical and quantum particle dynamics are important and involve many length scales. I will introduce the experiments, qualitative phenomenology, and some order-of-magnitude expectations from numerical plasma simulation. I will then discuss factorization of the photon angular distribution within the full theory of quantum electrodynamics and show that corrections to photon emission can be of order 50 despite the smallness of the QED coupling.