

Ultrarelativistic Electrons in Counterpropagating Laser Beams

Q Z LV¹, E RAICHER², C H KEITEL¹, AND K Z HATSAGORTSYAN¹

¹*Theoretical Quantum Dynamics and Quantum Electrodynamics, Max Planck Institute for Nuclear Physics, Heidelberg, Germany*

²*Applied physics department, SOREQ Nuclear Research Center, Yavne, Israel*
Contact Email: erez.raicher@mail.huji.ac.il

The dynamics and radiation of ultrarelativistic electrons in strong counterpropagating laser beams are investigated. Assuming that the particle energy is the dominant scale in the problem, an approximate solution of classical equations of motion is obtained, and the characteristic features of the motion are examined. A corresponding analytical expression for the spectral distribution of the emitted radiation is derived in the framework of the Baier-Katkov semiclassical approximation (taking the quantum recoil into account). Special attention is devoted to settings when the description of radiation via the local constant field approximation (LCFA) fails and to the corresponding spectral features.