Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, 10.05.2022 16:00

ZOOM video seminar (needs version 5.8+)

Electrodynamic Processes at High Energies with “Half-Bared” Electrons: LPM, TSF effects and their Analogues

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Abstract

The recovery of the intrinsic Coulomb field of an ultra-relativistic particle that has experienced scattering through a significant angle requires some time. Moving at a speed close to the speed of light, such a particle can travel a considerable distance while being in the so-called "half-naked" state. This distance is called the coherence length or the zone of formation of one or another electrodynamic process. In the case of bremsstrahlung in an amorphous medium, this leads to significant differences from the predictions of the Bethe-Heitler theory, and, in particular, to the Landau-Pomeranchuk-Migdal effect of radiation suppression. This report presents the results of a theoretical study of this and related effects, as well as the results of experiments on these effects at the SLAC and CERN accelerators. We also discuss the possibility of observing such effects in other electrodynamic processes, such as transition radiation, ionization energy losses of charged particles, as well as the possibility of the existence of their analogues to chromodynamics in the interaction of quarks and gluons.

W.Hillert, (Univ. HH), I.Agapov (MPY) and M.Vogt (MFL).

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