Radiation from Relativistic Electrons in Periodic Structures "RREPS-15"



Contribution ID: 102

Type: Oral

Influence of an Electric Field on the Propagation of a Photon in a Magnetic field

Monday 7 September 2015 12:40 (15 minutes)

In this work, a constant and uniform magnetic field is less than the Schwinger critical value. In turn, an additional constant and uniform electric field is taken much smaller than the magnetic field value. The propagation of a photon in this electromagnetic field is investi-gating. In particular, in the presence of a weak electric field, the root divergence is absent in the photon effective mass near the thresholds of pair creation. This is due to the fact that at the formation time of the processes, the particles of creating pair get the additional mo-mentum from the electric field. Thus, there may the sufficiently large width of the Landau levels in presence of a very weak electric field. If this width becomes of the same order or greater than the distance apart Landau levels, these levels overlap and one can use the method of the stationary phase. Under this condition the quasiclassical approach [1] is valid where it is inapplicable in the absence of electric field. In the opposite case for small value of the level width, the quasiclassical method is not applicable near the thresholds. This is the quantum case and we use the new method of studying process [2].

References

- 1. V.M. Katkov, JETP, 114 (2012) 226.
- 2. V.M. Katkov, ArXiv 1311.6206 (2013).

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Session Classification: 1. General Aspects of Physical Phenomena and Processes Associated with Electromagnetic Radiation

Track Classification: 1. General Aspects of Physical Phenomena and Processes Associated with Electromagnetic Radiation