**Physics in Intense Fields (PIF22)** 



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## Highly Radiating Charged Particles in a Strong Electromagnetic Field

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There is a famous  $\alpha \chi^{2/3} \sim 1$  problem of a perturbation theory for QED in a strong electromagnetic field. It leads to the situation when radiation losses of highly energetic electrons in a sufficiently high intensity electromagnetic wave cannot be calculated reliably in the frame of the perturbation theory because of divergence of its series at  $\alpha \chi^{2/3} \sim 1$ . We consider the latter problem trying to avoid as possible using of the perturbation theory. We argue that the leading order term of asymptotic expression for the rate of radiation losses of an electron with its energy tending to infinity coincides with the leading order of the asymptotics obtained in the 1st order of the perturbation theory. The analogous statement can be made for electron-positron pairs production by a high energetic gamma-photons in a strong electromagnetic wave. These results provide possibilities to draw a self-consistent conclusion about invariant masses of electrons and photons in a strong electromagnetic field when their energies tend to infinity. We explain why these results can hardly (if possible) be obtained in the frame of a regular perturbation theory.

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