Short-Term Evolution of Electron Wave Packet in Constant Crossed Field with Radiative Corrections

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We study the dynamics of an electron wave packet in a strong constant crossed electromagnetic field with account for radiative corrections caused by the interaction of the electron with the vacuum fluctuations. We solve the Dirac-Schwinger equation, which is the Dirac equation supplemented by the term containing the mass operator. The solution is found for the evolution of a wave packet without real photon emission. Its time of validity is restricted from above, especially strongly for the packets which are wide in momentum space. The radiative corrections modify the structure of the electron wave function, in particular, result in wave packet damping. The expectation value of the Dirac spin operator is also calculated.