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Electron-positron-photon cascades in the strong laser field MAXIM LEGKOV, ALEXANDER FEDOTOV, National Research Nuclear University MEPhI — At nearest future several ambitious projects (such as ELI and HiPER) may provide laser filed intensity up to 10^{23}–10^{24} W/cm^2. In such strong fields quantum effects are essential. The most important among them is production of QED cascades. In this paper external field intensity is considered as ultra-relativistic but subcritical. Using a model of two colliding counter-propagating laser beams it was shown that the number of particles during the process is growing exponentially in time. This leads to vast formation of electron-positron-photon plasma. According to numerical simulations, this plasma quickly absorbs an essential part of the energy of the laser field thus leading to its depletion. Numerical simulation has been also performed for a case of high-energetic particle and laser beam collision. Probability rates of direct and recombination processes have been theoretically studied. Under some conditions, recombination may come into play and suppress cascade development. Using approximation of radiation in forward direction, system of kinetic equations, which describes plasma evaluation, was constructed. According to qualitative estimations based on kinetic equations, it was shown that recombination processes can be neglected for optical frequencies range of external field.

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