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Title: Pair creation by collision of intense laser pulse with high-frequency photon beam

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Abstract: We consider the general problem of pair creation from vacuum by collision of a couple of counter-propagating light pulses with arbitrary frequencies, having in mind mostly the nowadays widely discussed setup with collision of optical and coherent X- (or gamma-) ray pulses. This problem in general does not admit exact analytical solutions. We discuss the landscape of the problem in the space of parameters and very briefly review the known approaches invented by different authors (mentioning the results of Nikishov and Ritus; Brezin, Itzykson and Popov; Baier and Katkov and some others) to show that they do not cover completely the full landscape of the problem. Then we present a new simplified exactly solvable model with one of the pulses being a delta-pulse. This model is motivated by the recent Mourou-Tajima power-duration conjecture.

Although our model may not have immediate implications for the forthcoming experiments, we believe it can still provide some hints for better understanding of the fully non-perturbative regime and vacuum instability in QED interaction of extremely strong and short laser pulses.