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Wave equations in nonlinear quantum electrodynamics FRANCESCO PEGORARO, Department of Physics, University of Pisa, Italy and National Research Council, National Institute of Optics, Pisa, Italy, SERGEI V. BULANOV, Inst. Physics of the ASCR, ELI Beamlines, Prague, Czech Republic, Nat. Inst. Quantum Rad. Science Tech., Kansai Photon Science, Kizugawa, Japan — The nonlinear dynamics of counter-propagating laser beams offers a useful cross section of the physics of the nonlinear electromagnetic fields propagation in the quantum vacuum and in particular of the process of photon-photon scattering. At the same time it allows for the adoption of powerful analytical solution tools, such as the use of the hodograph transform (F. Pegoraro, S.V. Bulanov, Phys. Rev. D, 100, 036004 (2019)) which associates a linear problem to the initial nonlinear one by means of a nonlinear transformation. Here we present the nonlinear electromagnetic wave propagation in the long wave-length limit, as described by the Euler Heisenberg Lagrangian. Explicit solutions are presented and our analysis is extended to the case of the formation of a cumulation front in cylindrical geometry (F. Pegoraro, S.V. Bulanov, Rendiconti Lincei. Scienze Fisiche e Naturali, 31, 303 (2020))

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