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Generalization of Heitler model for electromagnetic cascade

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We consider a generalized Heitler model for QED cascade. An exact formula for the final number of leptons is obtained by solving the kinetic equations. We demonstrate that in such a model the final number of leptons does not depend on photon and lepton free paths. We derive approximate formulas for the main characteristics of cascades at high energy, including the final number of leptons and the cascade depth. We show that in general the final number of leptons is asymptotically proportional to the energy of seed particle. It is also demonstrated how the original Heitler model is reproduced as a special case.

Primary author(s) : SELIVANOV, Yuri; ФЕДОТОВ, Александр (National Research Nuclear University MEPhI)

Presenter(s) : SELIVANOV, Yuri

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