

Abstract Submitted
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Strong-field QED processes in laser and plasma environments SEBASTIAN MEUREN¹, CHRISTOPH H. KEITEL, ANTONINO DI PIAZZA, Max Planck Institute for Nuclear Physics, Heidelberg, Germany — Highly relativistic particles can probe the QED critical field if they propagate through strong electromagnetic fields, e.g., in a plasma environment [1]. In this regime nonlinear and nonperturbative QED effects become important and thus a complicated interplay between strong-field QED and plasma physics takes place. To render numerical calculations in this regime feasible the so-called QED-PIC approach has been developed [2], which is based on the semiclassical approximation. Recently, we have investigated the validity of the semiclassical approximation by examining the nonlinear Breit-Wheeler process (electron-positron photoproduction) inside a plane-wave laser field in detail [3]. In the talk the difference between classical and quantum absorption of laser energy, the importance of interference effects and the possibility of recollision processes [4] will be discussed.

[1] Di Piazza et al., *Rev. Mod. Phys.* **84**, 1177 (2012)

[2] A. Gonoskov et al., *Phys. Rev. E* **92**, 023305 (2015)

[3] SM, C. H. Keitel and A. Di Piazza, *Phys. Rev. D* **93**, 085028 (2016)

[4] SM, K. Z. Hatsagortsyan, C. H. Keitel and A. Di Piazza, *Phys. Rev. Lett.* **114**, 143201 (2015)

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