Abstract Submitted
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Theory of laser-assisted spontaneous radiative recombination[1] ILYA FABRIKANT, University of Nebraska - Lincoln, HARINDRANATH AMBALAMPITIYA, University of Nebraska-Lincoln — We study the process of laser-assisted radiative recombination of electron with proton by using a semiclassical approach involving calculation of classical trajectories in combined laser and Coulomb fields. Due to chaotic scattering in the combined fields[1], the radiation probability as a function of the impact parameter and the constant phase of the laser field exhibits fractal structures similar to those observed in bremsstrahlung[2]. We obtain a strong enhancement of the recombination cross section as compared to the laser-free case due to the Coulomb focusing effect[3]. For sufficiently low incident electron velocities the cross section becomes infinite, and we limit it by assuming a finite laser pulse duration of about 1 ps. With this assumption we obtain the gain factor for capture into the ground state of the hydrogen atom of about 74 for a terawatt field, and about 49 for a gigawatt field. [1]L. Wiesenfeld, Phys. Lett. A **144**, 467 (1990). [2]H. B. Ambalampitiya and I. I. Fabrikant, Phys. Rev. A **99**, 063404 (2019). [3]Th. Brabec, M. Yu. Ivanov, and P. B. Corkum, Phys. Rev. A **54** R2551 (1996).

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