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Effects of radiation-reaction on resonant phase locking in laser driven auto-resonant particle acceleration scheme SHIVAM MISHRA, SUDIP SENGUPTA, Institute for Plasma Research, Bhat, Gandhinagar, Gujarat, India- 382428, Homi Bhabha National Institute — It is well known that relativistic motion of a charged particle in the presence of a laser field and an external axial magnetic field, under resonance condition, results in unbounded energy gain by the particle. Technological advancements achieved in recent times have resulted in laser intensities $\sim 10^{22} W/cm^2$ and uniform magnetic field $\sim$ kilo Tesla, which not only make this scheme attractive but also leads to a regime where the effect of radiation-reaction becomes important. It has been recently shown that [Phys. Plasmas 22, 123102 (2015)] the inclusion of radiation-reaction in the particle's equation of motion, leads to saturation of the particle energy in the resonant case and a net energy gain in the non-resonant case. These results were obtained numerically for a monochromatic wave by solving the model equations of motion suggested by Landau-Lifshitz. In order to obtain a deeper insight and to verify whether the above results are model independent, in the present work, we have studied the above problem using the Hartmann equation of motion [Phys. Rev. Lett. 74, 1107 (1995)]. Our studies firstly show that the above results are indeed model independent and secondly there exist parameter regimes where the energy gain by the particle under non-resonant condition.

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