

ABSTRACT

In this work, we solve the relativistic equations of a single electron in beat wave laser beams, and we demonstrate three cases of interaction between laser field and electron which are capture, reflection, and transmission. When an electron is injected in a laser regime focused in a small dimensional area, the electron will absorb an amount of energy from the laser that depend on many factors related to the injection parameters of the electron and laser fields. In most cases the electron is captured by the laser and accelerated violently over a small spatial area, the last depend on how and when to inject the electron into the laser fields. Beat-wave laser configuration results by adding two propagated laser beams of the same amplitude but slightly different frequencies. Our aim is to investigate numerically the acceleration dynamics and radiative effects for such scheme for a single electron injected with an initial speed β (*speed scaled by the speed of light in vacuum c*) by using a famous numerical method which is adaptive Runge-Kutta. All theoretical parts of this work are based on the works and fields represented by Prof. Salamin. Laser fields will be modeled by Gaussian beam (i.e. tightly focused laser beam).