Relativistic harmonics generation by ultrashort and ultraintense laser pulse driven high density plasma

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Nonlinear interaction of ultraintense laser with a boundary of plane over dense plasma has been analytically and numerically studied. The bunches of charges formed by Brunel electrons push the plasma background electrons driving the electron plasma wave through a range of densities in the steep gradient, i.e., various plasma mirror configurations, at the surface of the plasma. For sliding mirror configuration, these oscillations when triggered once every energy cycle by Brunel electrons emit spectrum of harmonics of the incident frequency. The harmonics up to attosecond pulse for laser intensity ~ 10^{21} W/cm^2 have been reported. As the laser pulse is ultrashort, the ion motion has been neglected.