Polarization based optimization of laser accelerated electron beam characteristics

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In this paper, the influence of pulse polarization on the characteristics of the electron beam accelerated in the longitudinal field of a wake laser wave is investigated. Numerical PIC modeling by the particle-in-cell method was carried out for the case of an ultrashort laser pulse (10 fs) with dimensionless amplitude $a_0 = 24$. The case when the laser pulse falls on a homogeneous plasma layer with a constant density profile ($n_e = 0.05n_c$ and $n_e = 0.1n_c$) was considered, in contrast to the case when the laser pulse falls on a homogeneous plasma layer with a constant density profile ($n_e = 0.05n_c$ and $n_e = 0.1n_c$). The dependence of the characteristics of the accelerated electron beam on the possible parameters of the plasma and the laser pulse is discussed. A comparison is made for the cases of linear and circular polarization of the laser pulse.