Field ionization in laser pulse interaction with thin foil

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The concept of ionization-induced injection into the laser pulse to produce quasi-monoenergetic bunches of electrons from ultra-thin solid dense targets is analyzed. When the laser pulse propagates through semi-transparent foil the electrons from inner atom shells remain bound during the rise time of the laser pulse and are ionized by the laser intensity near its maximum amplitude, which satisfies the best injection condition for subsequent acceleration. It was found that a bunch of quasimonoenergetic electrons from inner atom shells moves co-directionally with laser pulse and acquire energy $\sim m_e c^2 \times a^2 / 2$. 