OPTIMIZATION OF SYNCHROTRON RADIATION IN THE CASE OF LASER PULSE PROPAGATION IN THE RELATIVISTIC SELF-TRAPPING REGIME

O. E. Vais, M. G. Lobok, V. Yu. Bychenkov

N. L. Dukhov All-Russian Research Institute of Automation, Moscow, Russia

P. N. Lebedev Physical Institute of the Russian Academy of Sciences, Moscow, Russia

In various regimes of laser wake acceleration of electrons, transverse oscillations of particles lead to the generation of synchrotron radiation, which has such unique properties as: ultra-short duration, record brightness and relatively low divergence [1, 2]. The characteristics of such a source of secondary radiation depend on the parameters of both the laser pulse and the density of the plasma target. This work is devoted to the effect of shortening the duration of a laser pulse of a given energy, which can be implemented by the CafCA (TFC) method [3, 4], on the spectral-angular characteristics of the generated synchrotron radiation. In recent studies [5, 6], it was shown that reducing the laser pulse duration from 40 to 10 fs results in increasing the conversion of the laser pulse energy into electron energy by up to 50%, as well as significantly increasing the total charge of high-energy electrons, so an improvement in the characteristics is expected for synchrotron radiation too. The studies were carried out for multiterawatt laser pulses with a duration of 10 and 40 fs, which propagated in the "laser bullet" and self-modulation regimes, respectively.

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