

Electron Acceleration And X-Rays Generation In The Intense Laser-Matter Interactions

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A wide-range model is used for the description of material response on the intense laser action. Comparison of experimental findings with the results of simulation is used both for the numerical model verification and for estimations of the interaction parameters that cannot be measured directly in experiments.

Electron acceleration mechanisms in view of current and future experiments are discussed. Experimental data on X-ray generation at relativistic laser intensities are presented and analysed.

Generation of energetic electron bunches in the laser interaction with preplasma created by laser prepulses at grazing incidence to solid targets is investigated. The influence of the driving laser pulse dynamics and electron bunch self-action to the processes of electron bunch compression and acceleration in the laser wakefield in guiding structures is analyzed. Laser wakefield acceleration of short electron bunches to multi-GeV energies is modelled and discussed.