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Photon emission and pair production in the interaction of ultra-intense lasers with electrons[1] MARTIN JIRKA, ONDREJ KLIMO, Czech Technical University in Prague, Czech Republic, SERGEI BULANOV, Japan Atomic Energy Agency, Kansai Photon Science Institute, Kyoto, Japan, STEFAN WEBER, Institute of Physics of the ASCR, ELI-Beamlines project, Prague, Czech Republic
— With the advent of 10 PW laser facilities, new regimes of laser-matter interaction are opening since QED effects come into play. Due to the radiation reaction which takes place in ultra-intense laser-matter interactions, charged particles lose their energy by emitting high-energy photons. These photons can in the strong laser field create electron-positron pairs via Breit-Wheeler process. One possible interaction scenario leading to efficient generation of pairs is the interaction of two colliding laser pulses with an electron target lying in the common focal spot. In our PIC simulations, gamma-ray photon emission and pair production are studied for different laser wavelengths, intensities and both laser polarization. According to our results, linearly polarized laser pulses seem to be more convenient for efficient pair creation. The role of ions contained in the target and its density are also assessed. Results are compared with the different interaction configuration when the energetic electron bunch interacts with one counter-propagating laser pulse.

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