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Radiation processes in laser-wakefield accelerators using particle tracking in PIC simulations JOANA MARTINS, FABIO PEANO, SAMUEL MARTINS, RICARDO FONSECA, LUÍS SILVA, GoLP/IPFN, Instituto Superior Técnico, Portugal — The detailed dynamics of relativistic particles in LWFA can be followed with PIC simulations but resolving short-wavelength radiation, e.g. from betatron oscillations, in 3D simulations can be computationally very demanding. We employ particle tracking in OSIRIS simulations, combined with a post-processing radiation diagnostic, to evaluate the features of the radiation mechanisms of accelerated electron in blowout regime of the LWFA. Radiated power and spectra illustrate the signature of self-injection and allows us to determine the main features of the collimated radiation beam due to the betatron motion in the blowout region. A study of the angular dependence of the radiated power is also presented and compared with theoretical models. This analysis also allows for the direct calculation of the radiation losses of the self-injected bunch. Results and discussion are presented for both 1 GeV and 10 GeV laser wakefield accelerator stages.

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