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Modeling Nonlinear Thomson/Compton scattering of LWFA GeV electron bunches JOANA LUIS MARTINS, MARIJA VRANIC, JORGE VIEIRA, THOMAS GRISMAYER, RICARDO FONSECA, LUIS SILVA, GoLP/Instituto de Plasmas e Fusao Nuclear, Laboratorio Associado, Instituto Superior Tecnico, Lisbon, 1049-001, Portugal — Laser-wakefield accelerators have been shown to produce bunches on the GeV energy level in few cm of plasma. There is growing interest on the possibility of using them in all-optical schemes for X-ray/Gamma-ray radiation sources, where the laser pulses Thomson/Compton scatter with these bunches. These scenarios can also provide a means to detect signatures of radiation damping. With laser pulses already available, with focused intensities on the order of 10^{21} W/cm^2, a scheme where a GeV energy electron bunch scatters the laser and looses approximately half of its energy is possible. This and similar scenarios will be explored numerically with a combination of PIC simulations performed with the OSIRIS 2.0 framework (with radiation damping) and the post-processing of the particle trajectories to obtain the radiation spectrum with quantum corrections. The role of this corrections and the damping on the spectrum shape and emitted energy will be explored. The results will also be compared with spectra obtained from a modified version of OSIRIS 2.0 where QED processes were implemented to model the radiation emission and the cooling of the electrons through a Monte-Carlo module.

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