Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Laser pulse scattering in the transition from the classical to the quantum regime JOANA MARTINS, MARIJA VRANIC, THOMAS GRISMAYER, GoLP / IPFN, Instituto Superior Tecnico, RICARDO FONSECA, DCTI/ISCTE-Instituto Universitario de Lisboa, LUIS SILVA, GoLP / IPFN, Instituto Superior Tecnico — At ultra-high intensities, laser pulse scattering on electron beams can lead to significant energy loss through radiation damping, for example in all-optical configurations. At small χ parameters, the radiation damping can still be modeled classically. The radiation emission can then be obtained in simulations by combining radiation damping in the particle dynamics and introducing quantum corrections in the classical emissivity formula due to the recoil of the emitting electron. With the formula implemented in the post-processing code jRad, this approach is checked through the comparison of the energy captured by the code in the detector with the energy that the particle is observed to lose by direct inspection of its trajectory. Results are shown for the scattering of circularly polarized plane waves of increasing intensities by an electron. In this work, the spectrum from the scattering of ultra-high intensity laser pulses (up to a0 $\sim$ 30) by relativistic electrons (Lorentz factors of 1000s) is investigated. From laser intensities of a0 $\sim$ 10 to 30 a significant change in the spectrum shape is observed and spike-like features emerge. The origin of such features is investigated for different pulse intensities and durations.

Joana Martins
GoLP / IPFN, Instituto Superior Tecnico

Date submitted: 24 Jul 2015 Electronic form version 1.4