Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Single particle dynamics in ultra intense laser fields including radiation cooling[1] MARIJA VRANIC, RICARDO A. FONSECA, LUIS O. SILVA, GoLP/IPFN - Instituto Superior Tecnico, Lisbon, Portugal — Under extreme acceleration, charged particles can radiate strongly and the corresponding radiation damping/cooling can become important. This occurs when the radiated energy in a typical oscillation period (e.g. cyclotron period or laser period) is comparable to mc^2. In particular, under the presence of ultra high static fields or high intensity lasers the motion of particles in the ultrarelativistic regime can be severely affected by radiation damping. Using a single particle dynamics code and the Osiris 2.0 framework, and including radiation cooling, we have examined and identified the different qualitative regimes for single electron interaction with counter- and co-propagating ultra-intense lasers fields. For conditions where the radiation cooling is important, qualitative differences arise as compared with the scenarios where radiation cooling is absent; this is identified not only in the particle phase space trajectories, but also on the net velocity imparted to the counter-propagating electrons, and the possibility of cooling particle beams.

[1]Work partially supported by FCT (Portugal)

Marija Vranic
GoLP/IPFN - Instituto Superior Tecnico, Lisbon, Portugal

Date submitted: 16 Jul 2010 Electronic form version 1.4