

Abstract Submitted
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Comparison of radiation cooling models for particle-in-cell simulations¹ MARIJA VRANIC, JOANA L. MARTINS, LUIS O. SILVA, GoLP/IPFN, Instituto Superior Técnico, Lisboa, Portugal — Under extreme acceleration, charged particles can radiate strongly and the corresponding radiation damping/cooling can become important in the plasma energetics and dynamics. This occurs when radiated energy in the interaction time is comparable to mc^2 . In particular, under the presence of ultra high intensity lasers or other intense electro/magnetic fields the motion of particles in the ultrarelativistic regime can be severely limited by radiation damping. The standard Particle-in-Cell (PIC) algorithms do not include radiation damping/cooling effects. Even though this is a well known mechanism, there is not yet a definite algorithm nor a standard technique to include radiation cooling in PIC codes. We have compared several models for the calculation of radiation damping force, with the goal of developing an algorithm for radiation damping in Osiris [1]. The results of the different models are compared with analytical models and standard results, and the relevance/advantages of each model are discussed.

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