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Effects of radiation damping in extreme ultra-intense laser-plasma interaction[1] RISHI PANDIT, YASUHIKO SENTOKU, Department of Physics, University of Nevada, Reno — Effects of the radiation damping in the interaction of extremely intense laser ($> 10^{22}$ W/cm^2) with overdense plasma are studied via a relativistic collisional particle-in-cell simulation, PICLS1D. We had derived the Landau-Lifshitz equation, which is the first order term of the Lorentz-Dirac equation, and also derived the second order term as the first time and implemented in the code. The code had been tested in a single particle motion at the extreme intensity laser. It was found that the first order damping term is reasonable up to the intensity 10^{22} W/cm^2, but the second oder term becomes not negligible and comparable to the first order term beyond 10^{23} W/cm^2. The radiation damping model was introduced to a one- dimensional particle-in-cell code (PIC), and tested in the laser - plasma interaction at extreme intensity. The strong damping of hot electrons in high energy tail was demonstrated in PIC simulations. Hot electrons generated by such extreme-intense laser lights on the plasma get the relativistic energy with gamma factor > 100, and lose energy strongly by emitting radiation. The second order term becomes comparable to the first order term when the laser intensity $> 10^{23}$ W/cm^2.

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