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Effects of radiation damping in ultra-intense laser matter interaction at extreme intensity regime[1] YASUHIKO SENTOKU, RISHI PANDIT, University of Nevada, Reno — Effects of the radiation damping in the interaction of extremely intense laser ($> 10^{22}$W/cm^2) with metal targets are studied via a relativistic collisional particle- in-cell simulation, PICLS. We had introduced the Landau-Lifshitz equation, which is the first order term of the Lorentz-Dirac equation to PIC, and also derived the second order term to check its effect. We had implemented these damping terms in the two- dimensional PICLS code, and had studied the laser plasma interaction at $> 10^{22}$W/cm^2 intensities. Hot electrons generated by such extreme-intense laser lights on the target get the relativistic energy with relativistic Lorentz factor $\gamma > 100$, and lose energy strongly by emitting radiations. Especially, we had studied the second term's effect in a comparison with the first order damping term, and found that the second term becomes comparable to the first order term when the laser intensity $> 10^{23}$W/cm^2. With the higher order term, the hot electrons with energies greater than 500 MeV are totally suppressed and hard them to go beyond that energy even increasing the laser intensity $> 10^{23}$W/cm^2.

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