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論文題目 ： **Radiation Reaction in the Interaction of Ultraintense Laser with Matter and Gamma Ray Source**

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論文要旨:

Radiation Reaction (RR) force plays an important role in gamma-ray production in the interaction of ultraintense laser with a relativistically counter-propagating electron. In order to produce an efficient gamma-ray for applications, the effects of RR should be taken into account. We have performed simulations for the dynamics of an electron in the strong laser field by taking into account the effects of RR. We investigate how the effects of RR influence the emission spectrum and photon number distribution for different laser conditions. We found that the peak strength of emission spectra is suppressed for higher initial kinetic energies of the electron. We observe that an electron with an energy of 40 MeV would convert maximally 80 % of the sum of electromagnetic work and its initial kinetic energy to the radiation energy when interacting with 10 fs laser pulse at intensity 2 x 1023 W/cm2. When treated self-consistently by means of Particle-in-Cell method, however, the conversion efficiency reduces to 8% due to the laser field energy depletion. We emphasize the importance of the realistic simulations with the inclusion of the RR properly to predict the properties of the radiation photon for practical applications.