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Spectral and angular distribution of photons via radiative damping in extreme ultra-intense laser-plasma interaction[1] RISHI PANDIT, YASUHIKO SENTOKU, University of Nevada, Reno — Spectral and angular distribution of photons produced in the interaction of extremely intense laser ($> 10^{22}$ W/cm^2) with dense plasma are studied with a help of a collisional particle-in-cell simulation, PICLS. In ultra-intense laser-plasma interaction, electrons are accelerated by the strong laser fields and emit γ-ray photons mainly via two processes, namely, Bremsstrahlung and radiative damping. We had developed numerical models of these processes in PICLS and study the spectrum and the angular distribution of γ-rays produced in the relativistic laser regime. Such relativistic γ-rays have wide range of frequencies and the angular distribution depends on the hot electron source. From the power loss calculation in PICLS we found that the Bremsstrahlung will get saturated at I $> 10^{22}$ W/cm^2 while the radiative damping will continuously increase. Comparing the details of γ-rays from the Bremsstrahlung and the radiative damping in simulations, we will discuss the laser parameters and the target conditions (geometry and material) to distinguish the photons from each process and how to catch the signature of the radiative damping in future experiments.

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