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Ultra-Bright X/γ Rays from Laser-Wire Target Interaction¹ TONG-PU YU, YAN YIN, FU-QIU SHAO, College of Science, National University of Defense Technology, Changsha 410073, China, ALEXANDER PUKHOV, Institut fur Theoretische Physik I, Heinrich-Heine-Universitat Dusseldorf, 40225 Dusseldorf, Germany — With the rapid development of laser facilities around the word, tabletop X/γ rays source based on laser plasma interaction becomes more and more important since its potential applications in medicine, science, and engineering. By using three-dimensional particle-in-cell simulations with radiation reaction effect incorporated, we study the dynamics of intense laser wire target interaction. When a circularly polarized laser pulse at an intensity of 10^{21} W/cm² irradiates a solid wire target with a transverse radius of 1.0 micrometers and a longitudinal length of 7 micrometers, electrons dragged out from the skin-length oscillate in the circularly polarized laser field transversely and are accelerated by the ponderomotive force in the forward direction. The electrons beyond the skin-length in the target reflux and move in the opposite direction to the laser propagation, providing a large amount of electrons for transverse oscillation. Finally, ultra-bright femtosecond-class synchrotron-like X/γ rays with a cut-off photon energy of about 10MeV are emitted in a very small cone angle, which may diverse applications in future.

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