

Abstract Submitted
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Generation of a few femtosecond keV X-ray pulse via interaction of a tightly-focused laser co-propagating with an relativistic electron bunch SANG-YOUNG CHUNG, Pusan National University, KITAE LEE, Korea Atomic Energy Research Institute, DONG EON KIM, POSTECH — The generation of ultrashort hard X-ray pulse is demonstrated in a series of numerical simulation of the Thomson scattering of high power femtosecond laser with a co-propagating electron bunch. When an electron bunch co-propagates with a focused laser pulse, the pulse width of the radiation is similar to it of the laser pulse because the relative velocity between laser pulse and electron bunch is almost zero and the interaction occurs only in the focused region. However, when the laser is loosely focused, the radiation power is much weaker than Compton backscattering or the interaction of other geometry. When a laser is focused tightly, high-order fields (HOFs) appear to satisfy the Maxwell equations. The HOFs drastically enhance the radiation power and the photon energy. This study shows that the co-propagating interaction can be photon source of 5 fs pulse width and 10-100 keV photon energy.

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