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Intense single attosecond pulse generation through coherent synchrotron emission from laser interaction with capacitor-nanofoil target X. R. XU, B. QIAO, Y. X. ZHANG, H. Y. LU, Peking University, H. ZHANG, Institute of Applied Physics and Computational Mathematics, B. DROMEY, Queen's University Belfast, R. F. LI, Peking University, C. T ZHOU, S. P. ZHU, Institute of Applied Physics and Computational Mathematics, M, ZEPF, Queen's University Belfast, X. T. HE, Peking University — In the relativistic laser-plasma interaction process, coherent synchrotron emission (CSE) has been identified as one of the most efficient mechanisms to produce attosecond pulse. However, the electron nanobunch, which is the key character of CSE, is highly sensitive to the interaction condition and is hard to be formed. Here we show that through irradiating on a capacitor-nanofoil target, which is composed of two separated nanofoils, this difficulty can be overcome. Both one-dimensional and two-dimensional particle-in-cell simulations reveal that the strong electrostatic field developed between two foils is responsible for the formation and the acceleration of the ultradense electron nanobunch. This nanobunch reaches both high density and energy in only half laser cycle and smears out in others, resulting in a single attosecond pulse with intensity up to $10^{21}W/cm^2$ and duration of 8as when the intensity of the driving laser of $7.7 \times 10^{21}W/cm^2$.

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