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Enhanced electron-positron pair production by irradiation of a thin foil target with two ultraintense laser pulses H.X. CHANG, B. QIAO, Z. XU, Peking University, M. BORGHESI, M. ZEPF, Queen's University Belfast, X.T. HE, Peking University — In this presentation, a novel scheme for enhanced QED production of electron-positron pair sources is reported, which uses two ultraintense lasers irradiating a thin foil from opposite sides. In the scheme, under a proper matching condition, in addition to the skin-depth emission of gamma-rays and the Breit-Wheeler creation of pairs on each side of the foil, a large number of high-energy electrons and photons from one side can propagate through it and interact with the laser on the other side, leading to much enhanced gamma-ray emission and pair production. Further, the created pairs are later collected and confined to the center by opposite laser radiation pressures when the foil becomes transparent, resulting in formation of dense electron-positron pairs. 2D QED-PIC simulations show that an unprecedented positron density of $10^{28}\mathrm{m}^{-3}$ can be achieved at laser intensities $3.4 \times 10^{23}\mathrm{W/cm}^2$.

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