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Controlling the Betatron Oscillations of Accelerated Electron Beams by Temporally-Asymmetric Laser Pulses in LWFA INHYUK NAM, Graduate Program of Photonics and Applied Physics, GIST, Gwangju 500-712, Korea, MIN SUP HUR, School of Electrical and Computer Engineering, UNIST, Ulsan, 689-798, Korea, HAN SUP UHM, Electrophysics Department, Kwangwoon University, Seoul 139-701, Korea, NASR A.M. HAFZ, Advanced Photonics Research Institute, GIST, Gwangju 500-712, Korea, HYYONG SUK, Graduate Program of Photonics and Applied Physics, GIST, Gwangju 500-712, Korea — We investigated the betatron oscillations of accelerated electron beams in laser wakefield acceleration by temporally-asymmetric laser pulses via two-dimensional particle-in-cell simulations. By using an asymmetric laser pulse having sharp rising and slow falling time scales, the accelerated electron beam can interact directly with the falling part of the laser field and the electrons will have transverse oscillations due to the phase-slip with the laser field. This oscillation can be matched with the betatron oscillation by the focusing force of the ions, which results in large transverse oscillation amplitude due to the resonance between two frequencies. Furthermore, the electron beam can be micro-bunched at the laser wavelength, which may provide the possibility for generation of a coherent synchrotron radiation. In this presentation, details of the phenomena are shown.

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