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Betatron radiation from the self-injected electrons in a laser wakefield SEOK WON HWANG, SANG-YOUNG CHUNG, HAE JUNE LEE, Pusan National University — When self-injected electrons in a laser wakefield are accelerated to a hundred MeV or 1 GeV, the electrons also oscillate by the focusing fields of the wakefield which are composed of transverse electric field and azimuthal magnetic field. This oscillation is called betatron oscillation. The oscillating electrons emit betatron radiation per a half period of the oscillation. The number of oscillations is dependent on the propagation length and the strength of the wakefields. The radiation has a broad spectrum with an energy band from a few eV to several keV and a beam divergence of tens of mrad. In this presentation, the self-injected electrons are traced using a relativistic electromagnetic particle-in-cell (EM-PIC) code, and the radiaitons emitted from the electrons are calculated from the particle motion. The characteristics of the radiations are compared with the results from a single electron simulation which was calculated with an assumption that the wakfields did not change for the propagation of the electron.

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