

Abstract Submitted
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Betatron radiation from an off-axis electron bunch in a PWFA¹ YI SHI, OULIANG CHANG, PATRIC MUGGLI, University of the Southern California, CHENGKUN HUANG, WEIMING AN, WARREN MORI, University of California, Los Angeles, PLASMA ACCELERATOR GROUP TEAM, UCLA PLASMA SIMULATION GROUP TEAM — In a plasma wakefield accelerator (PWFA) with a drive bunch density higher than the plasma, a pure ion column is formed behind the drive bunch (blow-out regime). Due to the ion restoring force, which is linearly increasing with radius, beam electrons perform betatron oscillations. We consider the case of a witness bunch entering the plasma with a radial offset or a transverse momentum component. In this case, the whole witness bunch oscillates about the beam axis defined by the drive bunch. We use the particle in cell code QUICKPIC [1] to simulate the plasma wakefields and we study the radiation characteristics as a function of the electron bunches and plasma parameters. We place the witness bunch at the position where the synchrotron-radiated power is compensated for by the energy gain from the wakefields. Detailed results will be presented.

[1] C.H. Huang, et al., J. Comp.Phys., 217(2), 658, (2006).

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