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Enhanced X-ray radiation from laser wakefield acceleration transition to plasma wakefield acceleration CHUANFEI DONG, ALEXANDER THOMAS, PAUL CUMMINGS, KARL KRUSHELNICK, Univ of Michigan - Ann Arbor — The electromagnetic fields responsible for Laser Wakefield Acceleration (LWFA) also cause electrons to radiate bright X-ray pulses through betatron oscillations [1,2]. Using 3-D OSIRIS particle in cell simulations with a Monte Carlo synchrotron X-ray emission algorithm, the X-ray flux was also shown to increase dramatically for interaction distances beyond the dephasing length, where the main electron beams in the first ion bubble catch up the laser pulse front. Subsequently, it forms a secondary beam in the tail of the first bubble. Laser wakefield acceleration transitions to beam driven plasma wakefield acceleration [3], which results in the onset of the electron-hose instability [4] and thus significantly enhances the X-ray radiation.

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