Abstract Submitted
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Beam dynamics in ionization injection[1] XINLU XU, WEI LU, Tsinghua University, Beijing, China, WARREN MORI, UCLA — We present new results from OSIRIS simulations and analytical theory on the beam dynamics of an electron beam formed via various ionization injection schemes. Two kinds of ionization injection scheme are carefully studied, a "standard" ionization injection scheme and the plasma photocathode scheme. Longitudinal mixing occurs as electrons created in the middle of the accelerating structure slip backwards to the rear of the bubble as they get trapped. The injection and trapping process induces emittance growth of the injection beam. We discuss thoroughly the influence of the injection distance, the acceleration distance, acceleration field and space charge force on the rms emittance of the injection beam. In the high charge case, the rms emittance is proportional to the spot size of the injection laser, $\epsilon \propto W_b^2$, where W_b is defined as effective spot size. OSIRIS simulation is present to support our theory.

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