Abstract Submitted
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Transverse phase-space properties of beams produced via ionization injection in laser-plasma accelerators[1] CARLO BENEDETTI, CARL SCHROEDER, STEPAN BULANOV, CAMERON GEDDES, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley Natl Lab — Ionization injection has become a commonly used technique to inject electrons in plasma wakefields. In ionization injection, electrons are ionized by an intense laser in the plasma wakefield, reducing the wakefield amplitude required for trapping. The lower trapping threshold allows operation at lower plasma densities, enabling higher beam energy gains. However, ionization injection can also result in poor quality of the trapped electron bunch, compared to self-injection. Here, we investigate, analytically and by means of numerical modeling, the trapping threshold, in 3D, for a relativistically intense ionizing laser driver. We characterize, as a function of wake phase velocity and laser intensity, the transverse phase-space properties at injection for the beam produced via ionization injection, and we compare it to that obtained in the case of self-injection. Techniques to improve the phase-space quality of the bunch produced via ionization injection will be discussed.

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