Abstract Submitted
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Manipulating ionization-injection trapping in laser wakefield accelerators[1] NUNO LEMOS, JESSICA SHAW, Univ of California - Los Angeles, C.J. ZHANG, Tsinghua university, K.A. MARSH, CHAN JOSHI, Univ of California - Los Angeles — Experiments have shown that when using tunneling ionization as an injection mechanism in laser wakefield acceleration (LWFA), electrons can be trapped and accelerated using roughly four times less laser power than required to self-trap electrons. Using the three-dimensional (3D) scaling laws for LWFAs in the blowout regime, it was found that injecting electrons directly into the wakefield significantly increases the potential difference for the electron to become trapped. This study further explores this injection mechanism in order to lower the electron energy spread and increase the available normalized wake potential. Two and 3D particle-in-cell simulations show that by changing the laser pulse duration and plasma density, one can control the trapping condition and energy spread.

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