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Comparison of flat beam PWFA analytic model with PIC simulations

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This paper explores the phenomenon of asymmetric blowout in plasma wakefield acceleration (PWFA), where the transversely asymmetric beam creates a transversely asymmetric blowout cavity in plasma. This deviation from the traditional axisymmetric models leads to unique focusing effects in the transverse plane and accelerating gradient depending on the transverse coordinates. We extend our series of studies on plasma wakefield acceleration (PWFA) by comparing our recently developed analytic model on the blowout cavity shape created by transversely asymmetric long beams, with Particle-in-Cell (PIC) simulations. The analysis focuses on validating the model's ability to predict the behaviors of different beam profiles in this regime.

Footnotes

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