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Transverse stability of multiple trailing bunches in filament-regime plasma wakefield acceleration

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Plasma wakefield acceleration in the filament regime can provide wakefields suitable for high-gradient, high-quality positron acceleration while maintaining stability. However, the energy that can be extracted by the positrons is limited. Recent works have proposed accelerating a supplementary electron recovery bunch along with the positron bunch to extract more energy from the wake and improve the overall transfer efficiency during acceleration. However, it is unclear if such energy recovery schemes are stable when subject to misalignment. In this work, we employ quasi-static particle-in-cell simulations to study the transverse stability of configurations involving three bunches.

Footnotes

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