

P5.2020 Parametric tolerance study of trojan horse plasma wakefield acceleration scheme

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See full abstract here <http://ocs.ciemat.es/EPS2019ABS/pdf/P5.2020.pdf>

A promising scheme for plasma wakefield acceleration is the hybrid plasma acceleration mechanism, which is experimentally connected to world-wide programs at various accelerator facilities. This scheme may lead to extremely high quality electron bunches, which can be used to drive ultrabright light sources such as free electron lasers. The big challenge for plasma acceleration is to produce electron bunches with high quality in terms of low emittance, energy spread and high brightness. To overcome this challenge, the Trojan Horse scheme [1,2,3,4] is used for production of designer electron beams.

This work explores the Trojan Horse mechanism in a parametric study by variation of the injector laser pulse by intensity, spot size and relative spatiotemporal synchronization and alignment. These parameters define output electron witness beam parameters and its quality. This sensitivity study shows a high robustness of the scheme, which is promising for a wider key prospect of the approach, namely the development of compact plasma accelerators to produce electron beams with unprecedented emittance and brightness in order to power freeelectron lasers.

References

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