



Contribution ID: 125

Type: **Poster**

Low energy spread beams with single stage, single bunch Trojan Horse injection

Tuesday, 23 July 2024 18:00 (1h 30m)

The high accelerating gradients of plasma-based acceleration can lead to beams with large projected energy spread, which necessitates schemes for energy spread reduction. Here we present a ‘direct beam-loading’ scheme that uses the Trojan Horse injection method [1] to produce ultrahigh brightness beams in a single stage with a single bunch. Witness charge is optimised in simulation for projected energy spread minimisation to achieve 6D brightness of order $10^{17} \text{ A/m}^2 \text{ rad}^2 / 0.1\% \Delta E/E$ and slice brightness an order of magnitude above this. The relative energy spread is robust against witness charge variation, and combined with resilience to spatiotemporal jitter provided by the long plasma wavelength [2] ultrahigh brightness is maintained. Relative projected energy spread is locked in after ~ 20 mm of acceleration which provides scope to maintain beam properties to multi GeV energies.

Working group

WG3 : Beam-driven plasma acceleration

Primary author: BERMAN, Lily (University of Strathclyde)

Co-authors: HABIB, A. Fahim (University of Strathclyde); Prof. HIDDING, Bernhard (Heinrich Heine University Düsseldorf)

Presenter: BERMAN, Lily (University of Strathclyde)

Session Classification: Poster [Atrium]