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Transport Line for Laser-Plasma Acceleration Electron Beam

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The quest of laser plasma accelerators is of great interest for various applications such as light sources or high energy physics colliders. This research has led to numerous performance improvements, particularly in terms of beam energy versus compactness [1] and ultra-short bunch length [2]. However, these performances are often reached without the achievement of sufficient beam quality, stability and reproducibility. These are the objectives of PALLAS, a test facility at IJCLab, that aims to advance laser-plasma from *acceleration* to accelerators.

To this end, one of the main lines of research is the electron beam control and transport.

The primary goal is to have a lattice design that allows for a fine characterization of the output beam as a function of the laser-plasma wakefield acceleration target cell and laser parameters, while paying a particular attention to preserving the quality of the beam during its transport.

I will present the detailed strategy, considered for PALLAS, on the problematic of chromaticity and divergence for the transport of laser-plasma accelerated electron beams.

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Footnotes

[1] Oubriere, K. *et al.* Controlled acceleration of GeV electron beams in an all-optical plasma waveguide. *Light Sci Appl* **11**, 180 (2022).

[2] Lundh, O. *et al.* Few femtosecond, few kiloampere electron bunch produced by a laser-plasma accelerator. *Nature Physics* **7**, 219–222 (2011).

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