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Development of an achromatic spectrometer for a laser-wakefield-accelerator experiment

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The large gradients of plasma-wakefield accelerators promise to shorten accelerators and reduce their financial and environmental costs. For such accelerators, a key challenge is the transport of beams with high divergence and energy spread. Achromatic optics is a potential solution that would allow staging of plasma accelerators without beam-quality degradation. For this, a nonlinear plasma lens*is being developped within the SPARTA* project. As a first application of this lens, we aim to implement an achromatic spectrometer for electron bunches produced by a laser-wakefield accelerator. We report on progress in designing such an experiment.

Footnotes

- Drobniak, P., Adli, E., Anderson, H. B., Dyson, A., Mewes, S. M., Sjobak, K. N., Thévenet, M., Lindstrøm, C. A. (2024). Development of a nonlinear plasma lens for achromatic beam transport. arXiv preprint arXiv:2411.00925. ** European Commission, Staging of plasma accelerators for realizing timely applications (2023). URL https://doi.org/10.3030/101116161

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