



Contribution ID: 121

Type: **Contributed Oral**

Progress towards high-repetition-rate operation of a beam-driven plasma wakefield accelerator

Monday, 7 November 2022 13:30 (15 minutes)

Beam-driven plasma-wakefield accelerators offer significant potential as compact, high-gradient, high-quality accelerators, either as the basis of a future plasma-based facility or as an ‘after-burner’ stage appended to conventional accelerators to boost their peak energy. To maximise applicability of such devices, plasma-based accelerators must be capable of operating at repetition-rates consistent with, or exceeding, existing state-of-the-art conventional accelerator facilities. This contribution discusses results obtained at the FLASHForward experiment at DESY: a plasma-wakefield-acceleration experiment driven by the FLASH accelerator, which is capable of providing nC-level, GeV-scale electron bunches to the plasma accelerator stage at up to 3 MHz repetition rates. Of these results, the definition of the maximum possible repetition rate of a plasma-wakefield accelerator, as dictated by the time it takes for the plasma to recover to its initial state after a wakefield has been driven, will be highlighted. This result—indicating that repetition rates at the level of O(10 MHz) are attainable in future—makes it worthwhile to consider a high-repetition-rate after-burner stage for FLASH. This contribution will conclude with further results and concepts of how to achieve this goal.

Acknowledgments

Primary author: CHAPPELL, James (University of Oxford)

Co-authors: BEINORTAITE, Judita; Dr BOYLE, Gregory (DESY); DIEDERICHS, Severin (DESY / LBNL); Prof. FOSTER, Brian (University of Oxford); GARLAND, J. M.; GONZÁLEZ CAMINAL, Pau; LINDSTRØM, Carl A.; LOISCH, Gregor; Dr SCHREIBER, Siegfried (DESY); SCHRÖDER, Sarah; Dr SHALLOO, Rob (DESY); THÉVENET, Maxence (DESY); WESCH, Stephan; Prof. WING, Matthew (University College London); OSTERHOFF, Jens (DESY); D’ARCY, Richard

Presenter: CHAPPELL, James (University of Oxford)

Session Classification: WG4: Beam-Driven Acceleration

Track Classification: Working Group Parallel Sessions: WG4 Oral: Beam-Driven Acceleration