

# LIST OF PUBLICATIONS

## REFEREED JOURNAL PAPERS

- [1] R. D’Arcy, S. Wesch, A. Aschikhin, S. Bohlen, C. Behrens, M. J. Garland, L. Goldberg, P. Gonzalez, A. Knetsch, V. Libov, A. M. de la Ossa, M. Meisel, T. J. Mehrling, P. Niknejadi, K. Poder, J.-H. Röckemann, L. Schaper, B. Schmidt, S. Schröder, C. Palmer, J.-P. Schwinkendorf, B. Sheeran, M. J. V. Streeter, G. Tauscher, V. Wacker, and J. Osterhoff. *Tunable Plasma-Based Energy Dechirper*. **Phys. Rev. Lett.**, 122:034801, Jan 2019. URL <https://link.aps.org/doi/10.1103/PhysRevLett.122.034801>.
- [2] T. J. Mehrling, C. Benedetti, C. B. Schroeder, E. Esarey, and W. P. Leemans. *Suppression of Beam Hosing in Plasma Accelerators with Ion Motion*. **Phys. Rev. Lett.**, 121:264802, Dec 2018. URL <https://link.aps.org/doi/10.1103/PhysRevLett.121.264802>.
- [3] G. Loisch, G. Asova, P. Boonpornprasert, R. Brinkmann, Y. Chen, J. Engel, J. Good, M. Gross, F. Grüner, H. Huck, D. Kalantaryan, M. Krasilnikov, O. Lishilin, A. M. de la Ossa, T. J. Mehrling, D. Melkumyan, A. Oppelt, J. Osterhoff, H. Qian, Y. Renier, F. Stephan, C. Tenholt, V. Wohlfarth, and Q. Zhao. *Observation of High Transformer Ratio Plasma Wakefield Acceleration*. **Phys. Rev. Lett.**, 121:064801, Aug 2018. URL <https://link.aps.org/doi/10.1103/PhysRevLett.121.064801>.
- [4] A. Martinez de la Ossa, T. J. Mehrling, and J. Osterhoff. *Intrinsic Stabilization of the Drive Beam in Plasma-Wakefield Accelerators*. **Phys. Rev. Lett.**, 121:064803, Aug 2018. URL <https://link.aps.org/doi/10.1103/PhysRevLett.121.064803>.
- [5] M. Gross, J. Engel, J. Good, H. Huck, I. Isaev, G. Koss, M. Krasilnikov, O. Lishilin, G. Loisch, Y. Renier, T. Rublack, F. Stephan, R. Brinkmann, A. Martinez de la Ossa, J. Osterhoff, D. Malyutin, D. Richter, T. Mehrling, M. Khojayan, C. B. Schroeder, and F. Grüner. *Observation of the Self-Modulation Instability via Time-Resolved Measurements*. **Phys. Rev. Lett.**, 120:144802, Apr 2018. URL <https://link.aps.org/doi/10.1103/PhysRevLett.120.144802>.
- [6] T. J. Mehrling, C. Benedetti, C. B. Schroeder, A. M. de la Ossa, J. Osterhoff, E. Esarey, and W. P. Leemans. *Accurate modeling of the hose instability in plasma wakefield accelerators*. **Physics of Plasmas**, 25(5):056703, 2018. URL <https://doi.org/10.1063/1.5017960>.
- [7] A. Martinez de la Ossa, Z. Hu, M. J. V. Streeter, T. J. Mehrling, O. Kononenko, B. Sheeran, and J. Osterhoff. *Optimizing density down-ramp injection for beam-driven plasma wakefield accelerators*. **Phys. Rev. Accel. Beams**, 20:091301, Sep 2017. URL <https://link.aps.org/doi/10.1103/PhysRevAccelBeams.20.091301>.
- [8] R. Brinkmann, N. Delbos, I. Dornmair, M. Kirchen, R. Assmann, C. Behrens, K. Floettmann, J. Grebenyuk, M. Gross, S. Jalas, T. Mehrling, A. Martinez de la Ossa, J. Osterhoff, B. Schmidt, V. Wacker, and A. R. Maier. *Chirp Mitigation of Plasma-Accelerated Beams by a Modulated Plasma Density*. **Phys. Rev. Lett.**, 118:214801, May 2017. URL <https://link.aps.org/doi/10.1103/PhysRevLett.118.214801>.
- [9] T. J. Mehrling, R. A. Fonseca, A. Martinez de la Ossa, and J. Vieira. *Mitigation of the Hose Instability in Plasma-Wakefield Accelerators*. **Phys. Rev. Lett.**, 118:174801, Apr 2017. URL <https://link.aps.org/doi/10.1103/PhysRevLett.118.174801>.
- [10] R. E. Robson, T. J. Mehrling, and J. Osterhoff. *Great moments in kinetic theory: 150 years of Maxwells (other) equations*. **European Journal of Physics**, 38(6):065103, 2017. URL <http://stacks.iop.org/0143-0807/38/i=6/a=065103>.

- [11] A. Martinez de la Ossa, T. J. Mehrling, L. Schaper, M. J. V. Streeter, and J. Osterhoff. *Wakefield-induced ionization injection in beam-driven plasma accelerators*. **Physics of Plasmas**, 22(9):–, September 2015. URL <http://scitation.aip.org/content/aip/journal/pop/22/9/10.1063/1.4929921>.
- [12] R. Robson, T. Mehrling, and J. Osterhoff. *Phase-space moment-equation model of highly relativistic electron-beams in plasma-wakefield accelerators*. **Annals of Physics**, 356(0):306 – 319, May 2015. URL <http://www.sciencedirect.com/science/article/pii/S0003491615000998>.
- [13] T. Mehrling, C. Benedetti, C. B. Schroeder, and J. Osterhoff. *HiPACE: a quasi-static particle-in-cell code*. **Plasma Physics and Controlled Fusion**, 56(8):084012, July 2014. URL <http://stacks.iop.org/0741-3335/56/i=8/a=084012>.
- [14] A. Martinez de la Ossa, J. Grebenyuk, T. Mehrling, L. Schaper, and J. Osterhoff. *High-Quality Electron Beams from Beam-Driven Plasma Accelerators by Wakefield-Induced Ionization Injection*. **Phys. Rev. Lett.**, 111:245003, December 2013. URL <http://link.aps.org/doi/10.1103/PhysRevLett.111.245003>.
- [15] T. Mehrling, J. Grebenyuk, F. S. Tsung, K. Floettmann, and J. Osterhoff. *Transverse emittance growth in staged laser-wakefield acceleration*. **Phys. Rev. ST Accel. Beams**, 15:111303, November 2012. URL <http://link.aps.org/doi/10.1103/PhysRevSTAB.15.111303>.

## REFEREED CONFERENCE PROCEEDINGS

- [16] A. Aschikhin, T. J. Mehrling, A. Martinez de la Ossa, and J. Osterhoff. *Analytical model for the uncorrelated emittance evolution of externally injected beams in plasma-based accelerators*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, pages –, 2018. URL <https://www.sciencedirect.com/science/article/pii/S0168900218302195>.
- [17] M. Gross, O. Lishilin, G. Loisch, P. Boonpornprasert, Y. Chen, J. Engel, J. Good, H. Huck, I. Isaev, M. Krasilnikov, X. Li, R. Niemczyk, A. Oppelt, H. Qian, Y. Renier, F. Stephan, Q. Zhao, R. Brinkmann, A. M. de la Ossa, J. Osterhoff, F. J. Grüner, T. Mehrling, C. B. Schroeder, and I. Will. *Characterization of self-modulated electron bunches in an argon plasma*. **Journal of Physics: Conference Series**, 1067(4):042012, 2018. URL <http://stacks.iop.org/1742-6596/1067/i=4/a=042012>.
- [18] V. Libov, A. Aschikhin, J. Dale, R. D’Arcy, K. Ludwig, A. Martinez de la Ossa, T. Mehrling, J.-H. Roeckemann, L. Schaper, B. Schmidt, S. Schröder, S. Wesch, J. Zemella, and J. Osterhoff. *FLASHForward X-2: Towards beam quality preservation in a plasma booster*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, pages –, 2018. URL <https://www.sciencedirect.com/science/article/pii/S0168900218302171>.
- [19] P. Niknejadi, R. D’Arcy, M. C. Kaluza, A. Knetsch, V. Libov, A. M. de la Ossa, T. J. Mehrling, J. Osterhoff, C. A. J. Palmer, K. Poder, A. Słwert, L. Schaper, M. B. Schwab, and C. Wirth. *Status of the Transverse Diagnostics at FLASHForward*. **Journal of Physics: Conference Series**, 1067(4):042010, 2018. URL <http://stacks.iop.org/1742-6596/1067/i=4/a=042010>.
- [20] P. A. Walker, P. D. Alesini, A. S. Alexandrova, M. P. Anania, N. E. Andreev, I. Andriyash, A. Aschikhin, R. W. Assmann, T. Audet, A. Bacci, I. F. Barna, A. Beaton, A. Beck, A. Beluze, A. Bernhard, S. Bielawski, F. G. Bisesto, J. Boedewadt, F. Brandi, O. Bringer, R. Brinkmann, E. Bründermann, M. Büscher, M. Bussmann, G. C. Bussolino, A. Chance, J. C. Chanteloup,

- M. Chen, E. Chiadroni, A. Cianchi, J. Clarke, J. Cole, M. E. Couprie, M. Croia, B. Cros, J. Dale, G. Dattoli, N. Delerue, O. Delferriere, P. Delinikolas, J. Dias, U. Dorda, K. Ertel, A. F. Pousa, M. Ferrario, F. Filippi, J. Fils, R. Fiorito, R. A. Fonseca, M. Galimberti, A. Gallo, D. Garzella, P. Gastinel, D. Giove, A. Giribono, L. A. Gizzi, F. J. Grüner, A. F. Habib, L. C. Haefner, T. Heinemann, B. Hidding, B. J. Holzer, S. M. Hooker, T. Hosokai, A. Irman, D. A. Jaroszynski, S. Jaster-Merz, C. Joshi, M. C. Kaluza, M. Kando, O. S. Karger, S. Karsch, E. Khazanov, D. Khikhlikha, A. Knetsch, D. Kocon, P. Koester, O. Kononenko, G. Korn, I. Kostyukov, L. Labate, C. Lechner, W. P. Leemans, A. Lehrach, F. Y. Li, X. Li, V. Libov, A. Lifschitz, V. Litvinenko, W. Lu, A. R. Maier, V. Malka, G. G. Manahan, S. P. D. Mangles, B. Marchetti, A. Marocchino, A. M. de la Ossa, J. L. Martins, F. Massimo, F. Mathieu, G. Maynard, T. J. Mehrling, A. Y. Molodozhentsev, A. Mosnier, A. Mostacci, A. S. Mueller, Z. Najmudin, P. A. P. Nghiem, F. Nguyen, P. Niknejadi, J. Osterhoff, D. Papadopoulos, B. Patrizi, R. Pattathil, V. Petrillo, M. A. Pocsai, K. Poder, R. Pompili, L. Pribyl, D. Pugacheva, S. Romeo, A. R. Rossi, E. Roussel, A. A. Sahai, P. Scherkl, U. Schramm, C. B. Schroeder, J. Schwindling, J. Scifo, L. Serafini, Z. M. Sheng, L. O. Silva, T. Silva, C. Simon, U. Sinha, A. Specka, M. J. V. Streeter, E. N. Svystun, D. Symes, C. Sz waj, G. Tauscher, A. G. R. Thomas, N. Thompson, G. Toci, P. Tomassini, C. Vaccarezza, M. Vannini, J. M. Vieira, F. Villa, C.-G. Wahlstrm, R. Walczak, M. K. Weikum, C. P. Welsch, C. Wiemann, J. Wolfenden, G. Xia, M. Yabashi, L. Yu, J. Zhu, and A. Zigler. *Horizon 2020 EuPRAXIA design study*. **Journal of Physics: Conference Series**, 874(1):012029, 2017. URL <http://stacks.iop.org/1742-6596/874/i=1/a=012029>.
- [21] O. Lishilin, M. Gross, R. Brinkmann, J. Engel, F. Grüner, G. Koss, M. Krasilnikov, A. Martinez de la Ossa, T. Mehrling, J. Osterhoff, G. Pathak, S. Philipp, Y. Renier, D. Richter, C. Schroeder, R. Schütze, and F. Stephan. *First results of the plasma wakefield acceleration experiment at PITZ*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, 829:37 – 42, September 2016. URL <http://www.sciencedirect.com/science/article/pii/S0168900216000085>.
- [22] T. Mehrling, R. Robson, J.-H. Erbe, and J. Osterhoff. *Efficient numerical modelling of the emittance evolution of beams with finite energy spread in plasma wakefield accelerators*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, 829:367 – 371, September 2016. URL <http://www.sciencedirect.com/science/article/pii/S0168900216001418>.
- [23] A. Aschikhin, C. Behrens, S. Bohlen, J. Dale, N. Delbos, L. di Lucchio, E. Elsen, J.-H. Erbe, M. Felber, B. Foster, L. Goldberg, J. Grebenyuk, J.-N. Gruse, B. Hidding, Z. Hu, S. Karstensen, A. Knetsch, O. Kononenko, V. Libov, K. Ludwig, A. Maier, A. Martinez de la Ossa, T. Mehrling, C. Palmer, F. Pannek, L. Schaper, H. Schlarb, B. Schmidt, S. Schreiber, J.-P. Schwinkendorf, H. Steel, M. Streeter, G. Tauscher, V. Wacker, S. Weichert, S. Wunderlich, J. Zemella, and J. Osterhoff. *The FLASHForward facility at DESY*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, 806:175 – 183, January 2016. URL <http://www.sciencedirect.com/science/article/pii/S0168900215012103>.
- [24] J. Grebenyuk, A. Martinez de la Ossa, T. Mehrling, and J. Osterhoff. *Beam-driven plasma-based acceleration of electrons with density down-ramp injection at FLASHForward*. **Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, 740(o):246 – 249, March 2014. URL <http://www.sciencedirect.com/science/article/pii/S0168900213014356>.
- [25] A. Martinez de la Ossa, C. Behrens, J. Grebenyuk, T. Mehrling, L. Schaper, and J. Osterhoff. *High-quality electron beams from field-induced ionization injection in the strong blow-out regime of beam-driven plasma accelerators*. **Nuclear Instruments and Methods in Physics**

**Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment**, 740(o):231 – 235, March 2014. URL <http://www.sciencedirect.com/science/article/pii/S016890021301334X>.

- [26] J. Grebenyuk, T. Mehrling, F. S. Tsung, K. Floettman, and J. Osterhoff. *Simulations of laser-wakefield acceleration with external electron-bunch injection for REGAE experiments at DESY*. **AIP Conference Proceedings**, 1507:688–692, December 2012. URL <http://scitation.aip.org/content/aip/proceeding/aipcp/10.1063/1.4773781>. Proceedings of the AAC 2012, Austin, USA.

#### CONFERENCE PROCEEDINGS

- [27] C. Benedetti, C. B. Schroeder, T. J. Mehrling, E. Esarey, and W. P. Leemans. *Emittance preservation in plasma-based accelerators with ion motion*. In *9th International Particle Accelerator Conference (IPAC'18)*, 2018.
- [28] T. Mehrling, C. Benedetti, C. Schroeder, E. Esarey, and W. Leemans. *Accurate modeling of the hose instability in plasma based accelerators*. In *9th International Particle Accelerator Conference (IPAC'18)*, 2018.
- [29] R. D'Arcy and others. *FLASHForward - A Future-Oriented Wakefield-Accelerator Research and Development Facility at FLASH*. **Proc. of International Particle Accelerator Conference (IPAC'17), Copenhagen, Denmark, 14-19 May, 2017**, (8):1692–1695, May 2017. URL <http://jacow.org/ipac2017/papers/tupik006.pdf>. <https://doi.org/10.18429/JACoW-IPAC2017-TUPIK006>.
- [30] G. Loisch, G. Asova, P. Boonpornprasert, R. Brinkmann, J. Good, M. Groß, G. Florian, H. Huck, M. Krasilnikov, O. Lishilin, A. Martinez de la Ossa, T. Mehrling, A. Oppelt, J. Osterhoff, Y. Renier, T. Rublack, and F. Stephan. *Experimental Investigation of High Transformer Ratio Plasma Wakefield Acceleration at PITZ*. In *Proceedings, 8th International Particle Accelerator Conference (IPAC 2017): Copenhagen, Denmark, May 14-19, 2017*, page TUPIK018, 2017. URL <http://inspirehep.net/record/1626950/files/tupik018.pdf>.
- [31] G. Pathak, C. Benedetti, M. Groß, F. Grüner, A. Martinez de la Ossa, T. Mehrling, J. Osterhoff, C. Schroeder, and F. Stephan. *Simulations Study for Self-Modulation Experiment at PITZ*. In *Proceedings, 6th International Particle Accelerator Conference (IPAC 2015): Richmond, Virginia, USA, May 3-8, 2015*, page WEPWA005, 2015. URL <http://accelconf.web.cern.ch/AccelConf/IPAC2015/papers/wepwa005.pdf>.
- [32] J. Grebenyuk, T. Mehrling, K. Floettman, and J. Osterhoff. *Laser-Wakefield Acceleration with External Bunch Injection at REGAE*. In *Proceedings of RUPAC 2012, Saint-Petersburg, Russia, September 2012*. URL <http://accelconf.web.cern.ch/AccelConf/rupac2012/papers/moppa005.pdf>.

#### BOOK CHAPTERS

- [33] A. Martinez de la Ossa, T. Mehrling, and J. Osterhoff. *InSiDE*, volume 14, chapter Electron-injection techniques in plasma-wakefield accelerators for driving free-electron lasers, pages 65–68. GAUSS Center for Supercomputing (HLRS, LRZ, JSC), September 2016. URL <http://inside.hlrs.de/download.html>.

- [34] T. Mehrling and A. Martinez de la Ossa. *DESY Highlights and Annual Report: Accelerators 2016*, chapter Taming plasma waves: Start-to-end simulations reveal how to suppress hose instability in plasma wakefield accelerators, pages 60–61. Deutsches Elektronen-Synchrotron DESY: A Research Centre of the Helmholtz Association, 2016. URL [http://www.desy.de/sites2009/site\\_www-desy/content/e410/e84441/e243152/Accelerators\\_2016\\_eng.pdf](http://www.desy.de/sites2009/site_www-desy/content/e410/e84441/e243152/Accelerators_2016_eng.pdf).
- [35] J. Grebenyuk, J. Vieira, T. J. Mehrling, J. L. Martins, A. Martinez de la Ossa, R. A. Fonseca, L. O. Silva, and J. Osterhoff. *NIC Symposium 2014 - Proceedings: 12–13 February 2014 — Jülich, Germany*, chapter Radiation Generation in Plasma-Based Accelerators with Controlled Electron Injection, pages 427–434. Publication Series of the John von Neumann Institute for Computing (NIC). NIC, 2014. URL <http://juser.fz-juelich.de/record/151286/files/FZJ-2014-01274.pdf?version=1>.
- [36] T. J. Mehrling. *DESY Highlights and Annual Report: Particle Physics 2012*, chapter Tossed from wave to wave: Assessing staged plasma acceleration, pages 78–79. Deutsches Elektronen-Synchrotron: A Research Centre of the Helmholtz Association, 2012. URL [http://www.desy.de/sites2009/site\\_www-desy/content/e410/e84441/e139597/Particle\\_Physics\\_2012\\_eng.pdf](http://www.desy.de/sites2009/site_www-desy/content/e410/e84441/e139597/Particle_Physics_2012_eng.pdf).

## THESES

- [37] T. J. Mehrling. *Theoretical and numerical studies on the transport of transverse beam quality in plasma-based accelerators*. **Dissertation (PhD thesis)**, Universität Hamburg, Institut für Experimentalphysik, Luruper Chaussee 149, 22761 Hamburg, Germany, August 2014. URL <http://ediss.sub.uni-hamburg.de/volltexte/2014/7029/>.
- [38] T. Mehrling. *Studying laser wakefield acceleration of relativistic electron bunches in inhomogeneous plasma with PIC simulations*. **Diplomarbeit (Master’s thesis)**, Technische Universität München Arcisstraße 11, 80333 München, March 2011.