Reports from the publication and speakers committee

Edda Gschwendtner (CERN), Patric Muggli (MPP),
Giovanni Zevi Della Porta (MPP/CERN)

AWAKE Collaboration Meeting - 25 April 2023

https://indico.cern.ch/event/1256286

Administrative details

- Members:
  - Edda Gschwendtner, ex officio as CERN Project Leader
  - Patric Muggli, ex officio as Coordinator of the Physics and Experiment Board
  - [Konstantin Lotov, Chair]
    - Members of Budker Institute of Nuclear Physics and Novosibirsk State University were suspended from participation in AWAKE scientific committees in April 2022
  - GZ, junior member, Chair ad interim

- Email: awake-pc@cern.ch
- Rules: https://edms.cern.ch/ui/file/2030472/0.2/PubRulesOriginal_19April2021.pdf
  - Manage internal review of papers/talks/posters concerning AWAKE by AWAKE authors
    - Reminder: “all papers mentioning AWAKE, written by a member of the AWAKE collaboration, must be sent to the PC before submission, and also before being put on arXiv”
  - Determine if a paper is signed by “Collaboration”, organized review, maintain Official Author List
  - Keep a list of public papers: https://twiki.cern.ch/twiki/bin/view/AWAKE/AwakePublic
  - **Please send talks/posters at least 1 week before conference!**

Recently published multi-author papers

PHYSICAL REVIEW LETTERS **130,** 115001 (2023)

Mitigation of the Onset of Hosing in the Linear Regime through Plasma Frequency Detuning

Mariana Moreira[1,*] Patric Muggli,[2,3] and Jorge Vieira[1,†]
[1]*GoLP/Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico, Universidade de Lisboa, 1049-001 Lisboa, Portugal*
[2]*Max Planck Institute for Physics, D-80805 Munich, Germany*
[3]*CERN, CH-1211 Geneva, Switzerland*

(Received 1 August 2022; accepted 27 January 2023; published 17 March 2023)

PHYSICAL REVIEW ACCELERATORS AND BEAMS **25,** 101602 (2022)

Design and operation of transfer lines for plasma wakefield accelerators using numerical optimizers

R. Ramjiawan,[*,†] S. Döbert, J. Farmer, E. Gschwendtner, F. M. Velotti, L. Verra, and G. Zevi Della Porta
CERN, 1211 Geneva, Switzerland

V. Bencini[‡] and P. N. Burrows
John Adams Institute for Accelerator Science at University of Oxford, Oxford OX1 3RH, United Kingdom

Machine Learning: Science and Technology

Towards automatic setup of 18 MeV electron beamline using machine learning

Francesco Maria Velotti,* Brennan Goddard, Verena Kain, Rebecca Ramjiawan, and Giovanni Zevi Della Porta
CERN, Geneva, CH

Simon Hirlaender
University of Salzburg, Kapitelgasse 4/6, 5020 Salzburg, Austria

(Dated: April 5, 2023)

Contents lists available at ScienceDirect

Nuclear Inst. and Methods in Physics Research, A

journal homepage: www.elsevier.com/locate/nima

Full Length Article

Design of the proton and electron transfer lines for AWAKE Run 2c

R. Ramjiawan [a,*], V. Bencini [b,a], P.N. Burrows [b], F.M. Velotti [a]
[a] *CERN, CH-1211, Geneva, Switzerland*
[b] *John Adams Institute for Accelerator Science, University of Oxford, Oxford, United Kingdom*

Physics of Plasmas ARTICLE scitation.org/journal/php

Radiation reaction and its impact on plasma-based energy-frontier colliders

Cite as: Phys. Plasmas **30**, 043104 (2023); doi: 10.1063/5.0140525
Submitted: 28 December 2022 · Accepted: 11 March 2023 ·
Published Online: 4 April 2023

Hossein Saberi,[1,2,a] Guoxing Xia,[1,2,b] Mohammad R. Islam,[1,2] Linbo Liang,[1,2] and Can Davut[1,2]

Manuscripts recently submitted to the PC

Generation of 10-m-lengthscale plasma columns by resonant and off-resonant laser pulses

G. Demeter,[1,*] J. T. Moody,[2,†] M. Á. Kedves,[1] F. Batsch,[2,3] M. Bergamaschi,[2] V. Fedosseev,[3] E. Granados,[3] P. Muggli,[2] H. Panuganti,[3] and G. Zevi Della Porta[3,2]

[1] *Wigner Research Centre for Physics, Budapest, Hungary*
[2] *Max Planck Institute for Physics, Munich, Germany*
[3] *CERN, Geneva, Switzerland*

(Dated: February 14, 2023)

Optimization of Proton-Driven Plasma Wakefield Acceleration Using Bayesian Optimization and Neural Networks

Jiabao Guan[1], Chang You[1], Yuancun Nie[1,*], Guoxing Xia[2,*], and Jike Wang[1,*]

[1] *The Institute for Advanced Studies, Wuhan University, Wuhan, 430072, China*
[2] *Department of Physics and Astronomy, University of Manchester, Manchester, United Kingdom*

Manuscripts in circulation for Collaboration Review

Development of the Self-Modulation Instability of a Relativistic Proton Bunch in Plasma

L. Verra,[1,*] S. Wyler,[2] T. Nechaeva,[3] J. Pucek,[3] M. Bergamaschi,[3]
L. Ranc,[3] G. Zevi Della Porta,[1,3] E. Gschwendtner,[1] and P. Muggli[3]

(AWAKE Collaboration)

Collaboration List

Comments from collaboration: https://indico.cern.ch/event/1278005/

Official Author List currently being updated:

- Received replies from: Marburg, Dusseldorf, Manchester, UCL, IS Lisbon, Oxford, UNIST Korea, MPP
- No replies: Liverpool, Wigner, IPP Garching, IPP Greifswald, Wisconsin, Lausanne, Lancaster, TRIUMF, CERN
  - —> please send an email to awake-pc even if unchanged
- Novosibirsk: leaving list unchanged until further discussion

Recent proceedings

- IPAC 2023 (work in progress)
  - E. Guran, et al: AWAKE from Run 2a to Run 2b
  - P. Muggli: AWAKE: driving plasma wakefields with a proton bunch and accelerating electrons for particle physics applications
  - P. Muggli, et al: Self-modulation and current filamentation instabilities of long and wide proton bunches in plasma
  - V. Bencini, F. Velotti: Design of the new 18 MeV electron injection line for AWAKE Run2c
  - V. Bencini, et al: Beam characterization and optimization for AWAKE 18 MeV electron line
  - L. Verra, et al: Techniques to seed the self-modulation instability of a long proton bunch in plasma
- AAC
  - P. Muggli: Plasma Light As Diagnostic For Wakefields Driven By Developing Self-Modulation Of A Long Particle Bunch
  - L. Verra, et al: Focusing of a Long Relativistic Proton Bunch in Underdense Plasma
  - K.J. Moon, et al: Dominance of the tightly focused electron seed over the long proton bunch self-modulation in over-dense plasma
- Please keep the PC updated and send links to published proceedings so we can add them to the AWAKE webpage

Recent talks and posters

- AAC:
  - P. Muggli, L. Verra, K.J. Moon: see proceedings above
  - J. Pucek, et al: Effects of a plasma ramp on an electron bunch seeding self modulation of a proton bunch
  - L. Verra, et al: Self-Modulation Instability of a Wide and Long Relativistic Proton Bunch in Plasma
  - T. Nechaeva, et al: Hosing of a long relativistic particle bunch induced by an electron bunch
- DPG “Frühjahrestagung”:
  - E. Walter, et al: Towards Laboratory Astrophysics in Wakefield Accelerators
- DPC Spring Meeting of the Matter and Cosmos (SMuK)
  - P. I. Morales Guzman and P. Muggli: Numerical study of the non-linear plasma response to a long proton bunch and its effect on a short electron bunch
- MPP Fachbeirat:
  - J. Farmer, P. Morales Guzman, et al: The AWAKE experiment
- CERN Joint Accelerators Performance
  - G. Zevi Della Porta: HiRadMat+AWAKE Highlights and Requests
- LPAW
  - J. P. Farmer and G. Zevi Della Porta: Wakefield regeneration in a plasma accelerator
  - P. I. Morales Guzman, et al: Numerical study of non-linear plasma response to a long proton bunch and its effect on an electron bunch
  - P. Muggli, et al: Current Filamentation Instability of a Long Proton Bunch in Plasma
  - T. Nechaeva, et al: Hosing of a long proton bunch induced by short electron bunch
  - J. Pucek, et al: Reproducibility of wakefield amplitude from a plasma light diagnostic
  - P. Muggli: Highlights of the AWAKE Plasma Wakefield Acceleration Experiment
- EPS Plasma:
  - P. I. Morales Guzman, et al: PIC simulations of on-axis injection dynamics of charged particle bunches propagating through a low-density plasma ramp in a PWFA