Accelerator ML Living Review

Summary Statistics

per_year: 11
per_category: 16
per_venue/journal: 78
per_keyword: 14
monthly_trends: 75

Papers

Machine learning as a service system for particle accelerator and its application in CSNS
Mei, Hao, Zhang, Yuliang, Peng, Na, Cheng, Sinong, He, Yongcheng, Xue, Kangjia, Wang, Lin, Li, Mingtao, Wu, Xuan, Zhu, Peng (2025)
Radiation Detection Technology and Methods

A generative adversarial network to improve integrated mode proton imaging resolution using paired proton-carbon data.
Simard M, Fullarton R, Volz L, Schuy C, Chung S, Baker C, Graeff C, Fekete CC. (2025)
Med Phys

A Time-Series Approach for Machine Learning-Based Patient-Specific Quality Assurance of Radiosurgery Plans
Buzzi S, Mancosu P, Bresolin A, Gallo P, La Fauci F, Lobefalo F, Paganini L, Pelizzoli M, Reggiori G, Franzese C, Tomatis S, Scorsetti M, Lenardi C, Lambri N. (2025)
Bioengineering (Basel)

A Supervised Machine Learning Framework for Multipactor Breakdown Prediction in High-Power Radio Frequency Devices and Accelerator Components: A Case Study in Planar Geometry
Asif Iqbal, John Verboncoeur, Peng Zhang (2025)
arXiv

Geoff: The Generic Optimization Framework & Frontend for Particle Accelerator Controls
Penelope Madysa, Sabrina Appel, Verena Kain, Michael Schenk (2025)
arXiv

Towards Agentic AI on Particle Accelerators
Antonin Sulc, Thorsten Hellert, Raimund Kammering, Hayden Hoschouer, Jason St. John (2025)
arXiv

Acceleration of Multi-Scale LTS Magnet Simulations with Neural Network Surrogate Models
Louis Denis, Julien Dular, Vincent Nuttens, Mariusz Wozniak, Benoît Vanderheyden, Christophe Geuzaine (2025)
arXiv

Application Of Large Language Models For The Extraction Of Information From Particle Accelerator Technical Documentation
Qing Dai, Rasmus Ischebeck, Maruisz Sapinski, Adam Grycner (2025)
arXiv

Predictive Hydrodynamic Simulations for Laser Direct-drive Implosion Experiments via Artificial Intelligence
Zixu Wang, Yuhan Wang, Junfei Ma, Fuyuan Wu, Junchi Yan, Xiaohui Yuan, Zhe Zhang, Jie Zhang (2025)
arXiv

Towards Foundation Models for Experimental Readout Systems Combining Discrete and Continuous Data
James Giroux, Cristiano Fanelli (2025)
arXiv

Towards generalizable deep ptychography neural networks
Albert Vong, Steven Henke, Oliver Hoidn, Hanna Ruth, Junjing Deng, Alexander Hexemer, Apurva Mehta, Arianna Gleason, Levi Hancock, Nicholas Schwarz (2025)
arXiv

FusionMAE: large-scale pretrained model to optimize and simplify diagnostic and control of fusion plasma
Zongyu Yang, Zhenghao Yang, Wenjing Tian, Jiyuan Li, Xiang Sun, Guohui Zheng, Songfen Liu, Niannian Wu, Rongpeng Li, Zhaohe Xu, Bo Li, Zhongbing Shi, Zhe Gao, Wei Chen, Xiaoquan Ji, Min Xu, Wulyu Zhong (2025)
arXiv

A Surrogate model for High Temperature Superconducting Magnets to Predict Current Distribution with Neural Network
Mianjun Xiao, Peng Song, Yulong Liu, Cedric Korte, Ziyang Xu, Jiale Gao, Jiaqi Lu, Haoyang Nie, Qiantong Deng, Timing Qu (2025)
arXiv

Machine Learning approach to classifying quench antenna signals
Plebani, Alberto, Barzi, Emanuela, Teyber, Reed (2025)
Thesis

Machine Learning for superconducting magnets application
Stabilini, Elisa (2025)
Thesis

Developing Machine Learning Models for Proton Computed Tomography and LHCb Particle Tracking
Ackernley, Thomas (2025)
Thesis

Batch spacing optimization by reinforcement learning
Remta, Matthias, Velotti, Francesco, Rezagholi, Sharwin (2025)
Phys.Rev.Accel.Beams

Road map for the tuning of hadronic interaction models with accelerator-based and astroparticle data
Albrecht, J., Becker Tjus, J., Behling, N., Blazek, J., Bleicher, M., Boelhauve, J., Cazon, L., Conceicao, R., Dembinski, H., Dietrich, L., Ebr, J., Ellbracht, J., Engel, R., Fedynitch, A., Fieg, M., Garzelli, M.V., Gaudu, C., Graziani, G., Gutjahr, P., Haungs, A., Huege, T., Hymon, K., Hünnefeld, Mirco, Kampert, K.-H., Kardum, L., Kolk, L., Korneeva, N., Kröninger, K., Maire, A., Menjo, H., Morejon, L., Ostapchenko, S., Paakkinen, P., Pierog, T., Plotko, P., Prosekin, A., Pyras, L., Pöschl, T., Rautenberg, Julian, Reininghaus, M., Rhode, W., Riehn, F., Roth, M., Sandrock, A., Sarcevic, I., Schmelling, M., Sigl, G., Sjöstrand, T., Soldin, D., Unger, M., Utheim, M., Vícha, J., Werner, K., Windau, M.E., Zhukov, V. (2025)
arXiv

Self-supervised physics-informed generative networks for phase retrieval from a single X-ray hologram
Yang, Xiaogang, Hailu, Dawit, Kulvait, Vojt■ch, Jentschke, Thomas, Flenner, Silja, Greving, Imke, Campbell, Stuart I., Hagemann, Johannes, Schroer, Christian G., Wong, Tak Ming, Moosmann, Julian (2025)
Opt.Express

A Supervised Machine Learning Framework for Multipactor Breakdown Prediction in High-Power Radio Frequency Devices and Accelerator Components: A Case Study in Planar Geometry

Iqbal, Asif, Verboncoeur, John, Zhang, Peng (2025)
arXiv

Analysis note: measurement of thrust in $e^{+}e^{-}$ collisions at $\sqrt{s}$ = 91 GeV with archived ALEPH data
Badea, Anthony, Baty, Austin, Bossi, Hannah, Chen, Yu-Chen, Chen, Yi, Zhang, Jingyu, Innocenti, Gian Michele, Maggi, Marcello, McGinn, Chris, Peters, Michael, Sheng, Tzu-An, Mikuni, Vinicius, Avaylon, Matthew, Komiske, Patrick, Metodiev, Eric, Thaler, Jesse, Nachman, Benjamin, Lee, Yen-Jie (2025)
arXiv

Machine learning application for particle accelerator optimization-a review
Isti Dian Rachmawati, Nazrul Effendy, Taufik Taufik (2025)
IAES International Journal of Artificial Intelligence

Machine Learning for Particle Accelerators
Elena Fol, Auralee Edelen (2025)
Unknown Venue

FORT-GCN: A Fault-tolerant and Adaptive Accelerator Design for Efficient Graph Convolutional Network Inference
Ke Wang, Yingnan Zhao, Ahmed Louri (2025)
ACM Transactions on Embedded Computing Systems

(*Invited*) Analog Signal Processing Technologies for Power-Efficient Neural Network Inference and Training
Bert Jan Offrein (2025)
Meeting abstracts/Meeting abstracts (Electrochemical Society. CD-ROM)

Machine learning based parametrization of the resolution function for the first experimental area of the n_TOF facility at CERN
Petar Žugec, Marta Sabaté-Gilarte, Michael Bacak, Vasilis Vlachoudis, Adria Casanovas, Francisco García-Infantes (2025)
Nuclear Science and Techniques

-Diagnosis of Nasopalatine Duct and Nasopalatine Duct Cyst in CBCT Images: A Radiomics-Based Machine Learning Approach
H Duyan Yüksel, B Büyük, B Evlice (2025)
Dentomaxillofacial Radiology

Integration of Machine Learning-Based Plasma Acceleration Simulations into Geant4: A Case Study with the PALLAS Experiment
A. Sytov, K. Cassou, V. Kubytskyi, M. Lenivenko, A. Huber (2025)
arXiv

Optimisation of the Accelerator Control by Reinforcement Learning: A Simulation-Based Approach
Anwar Ibrahim, Denis Derkach, Alexey Petrenko, Fedor Ratnikov, Maxim Kaledin (2025)
arXiv

Physics-Informed Super-Resolution Diffusion for 6D Phase Space Diagnostics
Alexander Scheinker (2025)
arXiv

Optimizing Beam-Plasma Interactions Through Jitter Analysis Using Start-to-End Simulations
Robin Hwang (2024)
arXiv

Virtual Pulse Reconstruction Diagnostic for Single-Shot Measurement of Free Electron Laser Radiation Power
Till Korten, Vladimir Rybnikov, Peter Steinbach, Najmeh Mirian (2024)

arXiv

Harnessing Machine Learning for Single-Shot Measurement of Free Electron Laser Pulse Power
Till Korten, Vladimir Rybnikov, Mathias Vogt, Juliane Roensch-Schulenburg, Peter Steinbach, Najmeh Mirian (2024)
arXiv

Data-Driven Gradient Optimization for Field Emission Management in a Superconducting Radio-Frequency Linac
Steven Goldenberg, Kawser Ahammed, Adam Carpenter, Jiang Li, Riad Suleiman, Chris Tennant (2024)
arXiv

Data-Driven Discovery of Beam Centroid Dynamics
Liam A. Pocher, Irving Haber, Thomas M. Antonsen Jr., Patrick G. O'Shea (2024)
arXiv

Design and development of advanced Al-Ti-V alloys for beampipe applications in particle accelerators
Kamaljeet Singh, Kangkan Goswami, Raghunath Sahoo, Sumanta Samal (2025)
arXiv

Machine Learning for Reducing Noise in RF Control Signals at Industrial Accelerators
M. Henderson, J. P. Edelen, J. Einstein-Curtis, C. C. Hall, J. A. Diaz Cruz, A. L. Edelen (2024)
arXiv

Surrogate Models studies for laser-plasma accelerator electron source design through numerical optimisation
G. Kane, P. Drobniak, S. Kazamias, V. Kubytskyi, M. Lenivenko, B. Lucas, J. Serhal, K. Cassou, A. Beck, A. Specka, F. Massimo (2025)
arXiv

Beamline Steering Using Deep Learning Models
Dexter Allen, Isaac Kante, Dorian Bohler (2024)
arXiv

Beam-based Identification of Magnetic Field Errors in a Synchrotron using Deep Lie Map Networks
Conrad Caliari, Adrian Oeftiger, Oliver Boine-Frankenheim (2024)
arXiv

Linac_Gen: integrating machine learning and particle-in-cell methods for enhanced beam dynamics at Fermilab
Abhishek Pathak (2024)
arXiv

Automated Anomaly Detection on European XFEL Klystrons
Antonin Sulc, Annika Eichler, Tim Wilksen (2024)
arXiv

Accelerator beam phase space tomography using machine learning to account for variations in beamline components
Andrzej Wolski, Diego Botelho, David Dunning, Amelia E. Pollard (2024)
arXiv

Large Language Models for Human-Machine Collaborative Particle Accelerator Tuning through Natural Language
Jan Kaiser, Annika Eichler, Anne Lauscher (2024)
arXiv

Accelerating Cavity Fault Prediction Using Deep Learning at Jefferson Laboratory
Monibor Rahman, Adam Carpenter, Khan Iftekharuddin, Chris Tennant (2024)
arXiv

Anomaly Detection of Particle Orbit in Accelerator using LSTM Deep Learning Technology
Zhiyuan Chen, Wei Lu, Radhika Bhong, Yimin Hu, Brian Freeman, Adam Carpenter (2024)
arXiv

Machine-learning approach for operating electron beam at KEK e^-/e^+ injector Linac
Gaku Mitsuka, Shinnosuke Kato, Naoko Iida, Takuya Natsui, Masanori Satoh (2024)
arXiv

Cheetah: Bridging the Gap Between Machine Learning and Particle Accelerator Physics with High-Speed, Differentiable Simulations
Jan Kaiser, Chenran Xu, Annika Eichler, Andrea Santamaria Garcia (2024)
arXiv

Beyond PID Controllers: PPO with Neuralized PID Policy for Proton Beam Intensity Control in Mu2e
Chenwei Xu, Jerry Yao-Chieh Hu, Aakaash Narayanan, Mattson Thieme, Vladimir Nagaslaev, Mark Austin, Jeremy Arnold, Jose Berlioz, Pierrick Hanlet, Aisha Ibrahim, Dennis Nicklaus, Jovan Mitrevski, Jason Michael St. John, Gauri Pradhan, Andrea Saewert, Kiyomi Seiya, Brian Schupbach, Randy Thurman-Keup, Nhan Tran, Rui Shi, Seda Ogrenci, Alexis Maya-Isabelle Shuping, Kyle Hazelwood, Han Liu (2023)
arXiv

Robust Errant Beam Prognostics with Conditional Modeling for Particle Accelerators
Kishansingh Rajput, Malachi Schram, Willem Blokland, Yasir Alanazi, Pradeep Ramuhalli, Alexander Zhukov, Charles Peters, Ricardo Vilalta (2024)
arXiv

Machine Learning For Beamline Steering
Isaac Kante (2023)
arXiv

Variational Autoencoders for Noise Reduction in Industrial LLRF Systems
J. P. Edelen, M. J. Henderson, J. Einstein-Curtis, C. C. Hall, J. A. Diaz Cruz, A. L. Edelen (2023)
arXiv

Resilient VAE: Unsupervised Anomaly Detection at the SLAC Linac Coherent Light Source
Ryan Humble, William Colocho, Finn O'Shea, Daniel Ratner, Eric Darve (2023)
arXiv

Time-drift Aware RF Optimization with Machine Learning Techniques
R. Sharankova, M. Mwaniki, K. Seiya, M. Wesley (2023)
arXiv

Distance Preserving Machine Learning for Uncertainty Aware Accelerator Capacitance Predictions
Steven Goldenberg, Malachi Schram, Kishansingh Rajput, Thomas Britton, Chris Pappas, Dan Lu, Jared Walden, Majdi I. Radaideh, Sarah Cousineau, Sudarshan Harave (2023)
arXiv

Learning to Do or Learning While Doing: Reinforcement Learning and Bayesian Optimisation for Online Continuous Tuning
Jan Kaiser, Chenran Xu, Annika Eichler, Andrea Santamaria Garcia, Oliver Stein, Erik Bründermann, Willi Kuropka, Hannes Dinter, Frank Mayet, Thomas Vinatier, Florian Burkart, Holger Schlarb (2023)
arXiv

From Compact Plasma Particle Sources to Advanced Accelerators with Modeling at Exascale
Axel Huebl, Remi Lehe, Edoardo Zoni, Olga Shapoval, Ryan T. Sandberg, Marco Garten, Arianna

Formenti, Revathi Jambunathan, Prabhat Kumar, Kevin Gott, Andrew Myers, Weiqun Zhang, Ann Almgren, Chad E. Mitchell, Ji Qiang, David Grote, Alexander Sinn, Severin Diederichs, Maxence Thevenet, Luca Fedeli, Thomas Clark, Neil Zaim, Henri Vincenti, Jean-Luc Vay (2023)
arXiv

Forecasting Particle Accelerator Interruptions Using Logistic LASSO Regression
Sichen Li, Jochem Snuverink, Fernando Perez-Cruz, Andreas Adelmann (2023)
arXiv

Learning Electron Bunch Distribution along a FEL Beamline by Normalising Flows
Anna Willmann, Jurjen Couperus Cabada■, Yen-Yu Chang, Richard Pausch, Amin Ghaith, Alexander Debus, Arie Irman, Michael Bussmann, Ulrich Schramm, Nico Hoffmann (2023)
arXiv

Physics-constrained 3D Convolutional Neural Networks for Electrodynamics
Alexander Scheinker, Reeju Pokharel (2023)
arXiv

Identification of Magnetic Field Errors in Synchrotrons based on Deep Lie Map Networks
Conrad Caliari, Adrian Oeftiger, Oliver Boine-Frankenheim (2023)
arXiv

Data-driven Science and Machine Learning Methods in Laser-Plasma Physics
Andreas Döpp, Christoph Eberle, Sunny Howard, Faran Irshad, Jinpu Lin, Matthew Streeter (2023)
arXiv

Applications of Differentiable Physics Simulations in Particle Accelerator Modeling
Ryan Roussel, Auralee Edelen (2022)
arXiv

Prior-mean-assisted Bayesian optimization application on FRIB Front-End tunning
Kilean Hwang, Tomofumi Maruta, Alexander Plastun, Kei Fukushima, Tong Zhang, Qiang Zhao, Peter Ostroumov, Yue Hao (2022)
arXiv

Fault Prognosis in Particle Accelerator Power Electronics Using Ensemble Learning
Majdi I. Radaideh, Chris Pappas, Mark Wezensky, Pradeep Ramuhalli, Sarah Cousineau (2022)
arXiv

Machine learning-based analysis of experimental electron beams and gamma energy distributions
M. Yadav, M. Oruganti, S. Zhang, B. Naranjo, G. Andonian, Y. Zhuang, Ö. Apsimon, C. P. Welsch, J. B. Rosenzweig (2023)
arXiv

Review of Time Series Forecasting Methods and Their Applications to Particle Accelerators
Sichen Li, Andreas Adelmann (2022)
arXiv

Automatic setup of 18 MeV electron beamline using machine learning
Francesco Maria Velotti, Brennan Goddard, Verena Kain, Rebecca Ramjiawan, Giovanni Zevi Della Porta, Simon Hirlaender (2022)
arXiv

Diagnostics for Linac Optimization With Machine Learning
R. Sharankova, M. Mwaniki, K. Seiya, M. Wesley (2022)
arXiv

Transverse phase space tomography in the CLARA accelerator test facility using image compression and machine learning
Andrzej Wolski, Mark A. Johnson, Matthew King, Boris L. Militsyn, Peter H. Williams (2022)
arXiv

Using Kernel-Based Statistical Distance to Study the Dynamics of Charged Particle Beams in Particle-Based Simulation Codes
Chad E. Mitchell, Robert D. Ryne, Kilean Hwang (2022)
arXiv

Neural Network Solver for Coherent Synchrotron Radiation Wakefield Calculations in Accelerator-based Charged Particle Beams
Auralee Edelen, Christopher Mayes (2022)
arXiv

Adaptive Machine Learning for Time-Varying Systems: Towards 6D Phase Space Diagnostics of Short Intense Charged Particle Beams
Alexander Scheinker, Spencer Gessner (2022)
arXiv

Differentiable Preisach Modeling for Characterization and Optimization of Accelerator Systems with Hysteresis
R. Roussel, A. Edelen, D. Ratner, K. Dubey, J. P. Gonzalez-Aguilera, Y. K. Kim, N. Kuklev (2022)
arXiv

Mixed Diagnostics for Longitudinal Properties of Electron Bunches in a Free-Electron Laser
J. Zhu, N. M. Lockmann, M. K. Czwalinna, H. Schlarb (2022)
arXiv

A Neural Network Model of a Quasi-Periodic Elliptically Polarizing Undulator in Universal Mode
Ryan Sheppard, Cameron Baribeau, Tor Pedersen, Mark Boland, Drew Bertwistle (2022)
arXiv

Physics-informed neural network method for modelling beam-wall interactions
Kazuhiro Fujita (2022)
arXiv

Anomaly Detection in Particle Accelerators using Autoencoders
Jonathan P. Edelen, Nathan M. Cook (2021)
arXiv

Input Beam Matching and Beam Dynamics Design Optimization of the IsoDAR RFQ using Statistical and Machine Learning Techniques
Daniel Koser, Loyd Waites, Daniel Winklehner, Matthias Frey, Andreas Adelmann, Janet Conrad (2021)
arXiv

Neural Networks for ID Gap Orbit Distortion Compensation in PETRA III
Bianca Veglia, Ilya Agapov, Joachim Keil (2024)
arXiv

Time-Delayed Koopman Network-Based Model Predictive Control for the FRIB RFQ
Jinyu Wan, Shen Zhao, Wei Chang, Yue Hao (2024)
arXiv

Uncertainty Aware ML-based surrogate models for particle accelerators: A Study at the Fermilab Booster Accelerator Complex
Malachi Schram, Kishansingh Rajput, Karthik Somayaji Peng Li, Jason St. John, Himanshu Sharma (2022)
arXiv

Quantifying Uncertainty for Machine Learning Based Diagnostic
Owen Convery, Lewis Smith, Yarin Gal, Adi Hanuka (2021)
arXiv

Uncertainty Quantification for Virtual Diagnostic of Particle Accelerators
Owen Convery, Lewis Smith, Yarin Gal, Adi Hanuka (2021)

arXiv

Adaptive Latent Space Tuning for Non-Stationary Distributions
Alexander Scheinker, Frederick Cropp, Sergio Paiagua, Daniele Filippetto (2021)
arXiv

Adaptive deep learning for time-varying systems with hidden parameters: Predicting changing input beam distributions of compact particle accelerators
Alexander Scheinker, Frederick Cropp, Sergio Paiagua, Daniele Filippetto (2021)
arXiv

Using LSTM recurrent neural networks for monitoring the LHC superconducting magnets
Maciej Wielgosz, Andrzej Skocze■, Matej Mertik (2017)
arXiv

Coincident Learning for Beam-based RF Station Fault Identification Using Phase Information at the SLAC Linac Coherent Light Source
Jia Liang, William Colocho, Franz-Josef Decker, Ryan Humble, Ben Morris, Finn H. O'Shea, David A. Steele, Zhe Zhang, Eric Darve, Daniel Ratner (2025)
arXiv

Using Convolutional Neural Networks to Accelerate 3D Coherent Synchrotron Radiation Computations
Christopher Leon, Petr M. Anisimov, Nikolai Yampolsky, Alexander Scheinker (2025)
arXiv

Explainable physics-based constraints on reinforcement learning for accelerator controls
Jonathan Colen, Malachi Schram, Kishansingh Rajput, Armen Kasparian (2025)
arXiv

Accelerator system parameter estimation using variational autoencoded latent regression
Mahindra Rautela, Alan Williams, Alexander Scheinker (2024)
arXiv

Long Short-Term Memory Networks for Anomaly Detection in Magnet Power Supplies of Particle Accelerators
Ihar Lobach, Michael Borland (2024)
arXiv

Leveraging Prior Mean Models for Faster Bayesian Optimization of Particle Accelerators
Tobias Boltz, Jose L. Martinez, Connie Xu, Kathryn R. L. Baker, Zihan Zhu, Jenny Morgan, Ryan Roussel, Daniel Ratner, Brahim Mustapha, Auralee L. Edelen (2025)
arXiv

Optimizing Dynamic Aperture Studies with Active Learning
D. Di Croce, M. Giovannozzi, E. Krymova, T. Pieloni, S. Redaelli, M. Seidel, R. Tomás, F. F. Van der Veken (2024)
arXiv

Neural Network Prior Mean for Particle Accelerator Injector Tuning
Connie Xu, Ryan Roussel, Auralee Edelen (2022)
arXiv

Applications of object detection networks at high-power laser systems and experiments
Jinpu Lin, Florian Haberstroh, Stefan Karsch, Andreas Döpp (2022)
arXiv

A Neural Network approach to reconstructing SuperKEKB beam parameters from beamstrahlung
S. Di Carlo, G. Bonvicini, N. A. Althubiti, R. Ayad, E. De La Cruz-Burelo, I. Domínguez, B. O. El Bashir, H. Farhat, J. Flanagan, R. Gillard, S. Izaguirre Gamez, K. Kanazawa, K. Kumara, D. Liventsev, P. L. M. Podesta-Lerma, D. Ricalde-Herrmann, D. Rodriguez Perez, G. Tejeda-Muñoz,

M. Tobiyama I. Heredia de la Cruz (2022)
arXiv

Optimizing a Superconducting Radiofrequency Gun Using Deep Reinforcement Learning
David Meier, Luis Vera Ramirez, Jens Völker, Bernhard Sick, Jens Viefhaus, Gregor Hartmann (2022)
arXiv

Uncertainty aware anomaly detection to predict errant beam pulses in the SNS accelerator
Willem Blokland, Pradeep Ramuhalli, Charles Peters, Yigit Yucesan, Alexander Zhukov, Malachi Schram, Kishansingh Rajput, Torri Jeske (2021)
arXiv

Adaptive Machine Learning for Time-Varying Systems: Low Dimensional Latent Space Tuning
Alexander Scheinker (2021)
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Fast, efficient and flexible particle accelerator optimisation using densely connected and invertible neural networks
Renato Bellotti, Romana Boiger, Andreas Adelmann (2021)
arXiv

Invertible Surrogate Models: Joint surrogate modelling and reconstruction of Laser-Wakefield Acceleration by invertible neural networks
Friedrich Bethke, Richard Pausch, Patrick Stiller, Alexander Debus, Michael Bussmann, Nico Hoffmann (2021)
arXiv

Improving Surrogate Model Accuracy for the LCLS-II Injector Frontend Using Convolutional Neural Networks and Transfer Learning
Lipi Gupta, Auralee Edelen, Nicole Neveu, Aashwin Mishra, Christopher Mayes, Young-Kee Kim (2021)
arXiv

A Novel Approach for Classification and Forecasting of Time Series in Particle Accelerators
Sichen Li, Mélissa Zacharias, Jochem Snuverink, Jaime Coello de Portugal, Fernando Perez-Cruz, Davide Reggiani, Andreas Adelmann (2021)
arXiv

Real-time Artificial Intelligence for Accelerator Control: A Study at the Fermilab Booster
Jason St. John, Christian Herwig, Diana Kafkes, Jovan Mitrevski, William A. Pellico, Gabriel N. Perdue, Andres Quintero-Parra, Brian A. Schupbach, Kiyomi Seiya, Nhan Tran, Malachi Schram, Javier M. Duarte, Yunzhi Huang, Rachael Keller (2021)
arXiv

Surrogate Modeling of the CLIC Final-Focus System using Artificial Neural Networks
J. Ogren, C. Gohil, D. Schulte (2021)
arXiv

Physics-Based Deep Neural Networks for Beam Dynamics in Charged Particle Accelerators
Andrei Ivanov, Ilya Agapov (2020)
arXiv

Introduction to Machine Learning for Accelerator Physics
Daniel Ratner (2020)
arXiv

Machine learning for design optimization of storage ring nonlinear dynamics
Faya Wang, Minghao Song, Auralee Edelen, Xiaobiao Huang (2019)
arXiv

Studies in Applying Machine Learning to LLRF and Resonance Control in Superconducting RF Cavities
Jorge Alberto Diaz Cruz, Sandra Biedron, Manel Martinez-Ramon, Salvador Sosa, Reza Pirayesh (2019)
arXiv

The model of an anomaly detector for HiLumi LHC magnets based on Recurrent Neural Networks and adaptive quantization
Maciej Wielgosz, Matej Mertik, Andrzej Skocze■, Ernesto De Matteis (2017)
arXiv

Machine learning for analysis of plasma driven Ion source
N. Joshi, O. Meusel, H. Podlech (2018)
arXiv

First Steps Toward Incorporating Image Based Diagnostics Into Particle Accelerator Control Systems Using Convolutional Neural Networks
A. L. Edelen, S. G. Biedron, S. V. Milton, J. P. Edelen (2016)
arXiv

Neural Networks for Modeling and Control of Particle Accelerators
A. L. Edelen, S. G. Biedron, B. E. Chase, D. Edstrom, S. V. Milton, P. Stabile (2016)
arXiv

Harnessing the Power of Gradient-Based Simulations for Multi-Objective Optimization in Particle Accelerators
Kishansingh Rajput, Malachi Schram, Auralee Edelen, Jonathan Colen, Armen Kasparian, Ryan Roussel, Adam Carpenter, He Zhang, Jay Benesch (2024)
arXiv

BOOSTR: A Dataset for Accelerator Control Systems
Diana Kafkes, Jason St. John (2021)
arXiv

Model-free and Bayesian Ensembling Model-based Deep Reinforcement Learning for Particle Accelerator Control Demonstrated on the FERMI FEL
Simon Hirlaender, Niky Bruchon (2022)
arXiv

Autonomous Control of a Particle Accelerator using Deep Reinforcement Learning
Xiaoying Pang, Sunil Thulasidasan, Larry Rybarcyk (2020)
arXiv

AI-Assisted Transport of Radioactive Ion Beams
Sergio Lopez-Caceres, Daniel Santiago-Gonzalez (2025)
arXiv

Bayesian Optimization Algorithms for Accelerator Physics
Ryan Roussel, Auralee L. Edelen, Tobias Boltz, Dylan Kennedy, Zhe Zhang, Fuhao Ji, Xiaobiao Huang, Daniel Ratner, Andrea Santamaria Garcia, Chenran Xu, Jan Kaiser, Angel Ferran Pousa, Annika Eichler, Jannis O. Lubsen, Natalie M. Isenberg, Yuan Gao, Nikita Kuklev, Jose Martinez, Brahim Mustapha, Verena Kain, Weijian Lin, Simone Maria Liuzzo, Jason St. John, Matthew J. V. Streeter, Remi Lehe, Willie Neiswanger (2024)
arXiv

SPIRAL2 Cryomodules Models: a Gateway to Process Control and Machine Learning
Adrien Vassal, Adnan Ghribi, François Millet, François Bonne, Patrick Bonnay, Pierre-Emmanuel Bernaudin (2021)
arXiv

Predicting Beam Transmission Using 2-Dimensional Phase Space Projections Of Hadron Accelerators
Anthony Tran, Yue Hao, Brahim Mustapha, Jose L. Martinex Marin (2022)

arXiv

Machine Learning for Orders of Magnitude Speedup in Multi-Objective Optimization of Particle Accelerator Systems
Auralee Edelen, Nicole Neveu, Yannick Huber, Mattias Frey, Christopher Mayes, Andreas Adelmann (2020)
arXiv

Machine learning assisted non-destructive transverse beam profile imaging
Zhanibek Omarov, Selcuk Haciomeroglu (2021)
arXiv

GAIA: A General AI Assistant for Intelligent Accelerator Operations
Frank Mayet (2024)
arXiv

AI-Enabled Operations at Fermi Complex: Multivariate Time Series Prediction for Outage Prediction and Diagnosis
Milan Jain, Burcu O. Mutlu, Caleb Stam, Jan Strube, Brian A. Schupbach, Jason M. St. John, William A. Pellico (2025)
arXiv

Automated GI tract segmentation using deep learning
Manhar Sharma (2023)
arXiv

Domain Adaptation of Automated Treatment Planning from Computed Tomography to Magnetic Resonance
Aly Khalifa, Jeff Winter, Inmaculada Navarro, Chris McIntosh, Thomas G. Purdie (2022)
arXiv

Superconducting radio-frequency cavity fault classification using machine learning at Jefferson Laboratory
Chris Tennant, Adam Carpenter, Tom Powers, Anna Shabalina Solopova, Lasitha Vidyaratne, Khan Iftekharuddin (2020)
arXiv

Generative Adversarial Networks (GAN) for compact beam source modelling in Monte Carlo simulations
David Sarrut, Nils Krah, Jean-Michel Létang (2019)
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Machine Learning for Precision Dental Diagnosis: Real-Time X-Ray Detection and Patient Record Integration—SmiloScope
M. S. Padmini, Asha Rani Mahadeva, Madhu Nagaraj, Namratha Gopinath (2025)
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A Living Review Pipeline for AI/ML Applications in Accelerator Physics
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BitL: A Hybrid Bit-Serial and Parallel Deep Learning Accelerator for Critical Path Reduction
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ROBERT BENTO FLORENTINO, LUIZ GUSTAVO LOURENÇO MOURA (2025)
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