

# Accelerator ML Living Review

## Summary Statistics

per\_year: 11  
per\_category: 16  
per\_venue/journal: 94  
per\_keyword: 14  
monthly\_trends: 76

## 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, Vojtech, 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. Kubyskyi, 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 Caliri, 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  $\text{Se}^-/\text{e}^+$  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 Collocho, 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 Kuroпка, 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 Snuerink, Fernando Perez-Cruz, Andreas Adelman (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, Reju Pokharel (2023)

arXiv

**Identification of Magnetic Field Errors in Synchrotrons based on Deep Lie Map Networks**

Conrad Caliri, 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 tuning**

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 Adelman (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 Hirlander (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. Czwalińska, 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 Skoczko, 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 Colucho, 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)  
arXiv

**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 Skoczko, 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 Adelman (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)

arXiv

**Machine learning applied to single-shot x-ray diagnostics in an XFEL**

A. Sanchez-Gonzalez, P. Micaelli, C. Olivier, T. R. Barillot, M. Ilchen, A. A. Lutman, A. Marinelli, T. Maxwell, A. Achner, M. Agåker, N. Berrah, C. Bostedt, J. Buck, P. H. Bucksbaum, S. Carron, B. Cooper, J. P. Cryan, M. Dong, R. Feifel, L. J. Frasinski, H. Fukuzawa, A. Galler, G. Hartmann, N. Hartmann, W. Helml, A. S. Johnson, A. Knie, A. O. Lindahl, J. Liu, K. Motomura, M. Mucke, C. O'Grady, J-E. Rubensson, E. R. Simpson, R. J. Squibb, C. Sâthe, K. Ueda, M. Vacher, D. J. Walke, V. Zhaunerchyk, R. N. Coffee, J. P. Marangos (2016)

arXiv

**Action-Attentive Deep Reinforcement Learning for Autonomous Alignment of Beamlines**

Siyu Wang, Shengran Dai, Jianhui Jiang, Shuang Wu, Yufei Peng, Junbin Zhang (2024)

arXiv

**Image Segmentation using U-Net Architecture for Powder X-ray Diffraction Images**

Howard Yanxon, Eric Roberts, Hannah Parraga, James Weng, Wenqian Xu, Uta Ruett, Alexander Hexemer, Petrus Zwart, Nickolas Schwarz (2023)

arXiv

**Closing the loop: Autonomous experiments enabled by machine-learning-based online data analysis in synchrotron beamline environments**

Linus Pithan, Vladimir Starostin, David Mareš, Lukas Petersdorf, Constantin Völter, Valentin Munteanu, Maciej Jankowski, Oleg Kononov, Alexander Gerlach, Alexander Hinderhofer, Bridget Murphy, Stefan Kowarik, Frank Schreiber (2023)  
arXiv

**Artifact Identification in X-ray Diffraction Data using Machine Learning Methods**

Howard Yanxon, James Weng, Hannah Parraga, Wenqian Xu, Uta Ruett, Nicholas Schwarz (2022)  
arXiv

**An efficient search-and-score algorithm for ancestral graphs using multivariate information scores**

Nikita Lagrange, Herve Isambert (2024)  
arXiv

**Loss function to optimise signal significance in particle physics**

Jai Bardhan, Cyrin Neeraj, Subhadip Mitra, Tanumoy Mandal (2024)  
arXiv

**Efficient Compression of Sparse Accelerator Data Using Implicit Neural Representations and Importance Sampling**

Xihaier Luo, Samuel Lurvey, Yi Huang, Yihui Ren, Jin Huang, Byung-Jun Yoon (2024)  
arXiv

**Variable Rate Neural Compression for Sparse Detector Data**

Yi Huang, Yeonju Go, Jin Huang, Shuhang Li, Xihai Luo, Thomas Marshall, Joseph Osborn, Christopher Pinkenburg, Yihui Ren, Evgeny Shulga, Shinjae Yoo, Byung-Jun Yoon (2024)  
arXiv

**Inverse Surrogate Model of a Soft X-Ray Spectrometer using Domain Adaptation**

Enrico Ahlers, Peter Feuer-Forsen, Gregor Hartmann, Rolf Mitzner, Peter Baumgärtel, Jens Viehhaus (2025)  
arXiv

**Online tuning and light source control using a physics-informed Gaussian process**

A. Hanuka, J. Duris, J. Shtalenkova, D. Kennedy, A. Edelen, D. Ratner, X. Huang (2019)  
arXiv

**Deep-learning real-time phase retrieval of imperfect diffraction patterns from X-ray free-electron lasers**

Sung Yun Lee, Do Hyung Cho, Chulho Jung, Daeho Sung, Daewoong Nam, Sangsoo Kim, Changyong Song (2024)  
arXiv

**A Two-Stage Machine Learning-Aided Approach for Quench Identification at the European XFEL**

Lynda Boukela, Annika Eichler, Julien Branlard, Nur Zulaiha Jomhari (2024)  
arXiv

**Beam Detection Based on Machine Learning Algorithms**

Haoyuan Li, Qing Yin (2023)  
arXiv

**Weakly supervised learning for pattern classification in serial femtosecond crystallography**

Jianan Xie, Ji Liu, Chi Zhang, Xihui Chen, Ping Huai, Jie Zheng, Xiaofeng Zhang (2023)  
arXiv

**SpeckleNN: A unified embedding for real-time speckle pattern classification in X-ray single-particle imaging with limited labeled examples**

Cong Wang, Eric Florin, Hsing-Yin Chang, Jana Thayer, Chun Hong Yoon (2023)  
arXiv

**Accurate and confident prediction of electron beam longitudinal properties using spectral virtual diagnostics**

A. Hanuka, C. Emma, T. Maxwell, A. Fisher, B. Jacobson, M. J. Hogan, Z. Huang (2020)  
arXiv

**TempoRL: laser pulse temporal shape optimization with Deep Reinforcement Learning**

Francesco Capuano, Davorin Peceli, Gabriele Tiboni, Raffaello Camoriano, Bedrich Rus (2023)  
arXiv

**A Start To End Machine Learning Approach To Maximize Scientific Throughput From The LCLS-II-HE**

Aashwin Mishra, Matt Seaberg, Ryan Roussel, Fred Poitevin, Jana Thayer, Daniel Ratner, Auralee Edelen, Apurva Mehta (2025)  
arXiv

**Combined track finding with GNN & CKF**

Lukas Heinrich, Benjamin Huth, Andreas Salzburger, Tilo Wettig (2024)  
arXiv

**Improved selective background Monte Carlo simulation at Belle II with graph attention networks and weighted events**

Boyang Yu, Nikolai Hartmann, Luca Schinnerl, Thomas Kuhr (2023)  
arXiv

**Towards Reliable Neural Generative Modeling of Detectors**

Lucio Anderlini, Matteo Barbetti, Denis Derkach, Nikita Kazeev, Artem Maevskiy, Sergei Mokhnenko (2022)  
arXiv

**Hybrid Quantum Classical Graph Neural Networks for Particle Track Reconstruction**

Cenk Tüysüz, Carla Rieger, Kristiane Novotny, Bilge Demirköz, Daniel Dobos, Karolos Potamianos, Sofia Vallecorsa, Jean-Roch Vlimant, Richard Forster (2021)  
arXiv

**Graph Generative Models for Fast Detector Simulations in High Energy Physics**

Ali Hariri, Darya Dyachkova, Sergei Gleyzer (2021)  
arXiv

**Beyond 4D Tracking: Using Cluster Shapes for Track Seeding**

Patrick J. Fox, Shangqing Huang, Joshua Isaacson, Xiangyang Ju, Benjamin Nachman (2021)  
arXiv

**Fast Data-Driven Simulation of Cherenkov Detectors Using Generative Adversarial Networks**

Artem Maevskiy, Denis Derkach, Nikita Kazeev, Andrey Ustyuzhanin, Maksim Artemev, Lucio Anderlini (2019)  
arXiv

**Accelerating the BSM interpretation of LHC data with machine learning**

Gianfranco Bertone, Marc Peter Deisenroth, Jong Soo Kim, Sebastian Liem, Roberto Ruiz de Austri, Max Welling (2016)  
arXiv

**Radar Pulse Deinterleaving with Transformer Based Deep Metric Learning**

Edward Gunn, Adam Hosford, Daniel Mannion, Jarrod Williams, Varun Chhabra, Victoria Nockles (2025)  
arXiv

**Deep Spectrum Cartography: Completing Radio Map Tensors Using Learned Neural Models**

Sagar Shrestha, Xiao Fu, Mingyi Hong (2022)  
arXiv

**Radar Emitter Classification with Attribute-specific Recurrent Neural Networks**

Paolo Notaro, Magdalini Paschali, Carsten Hopke, David Wittmann, Nassir Navab (2019)

arXiv

### **Prediction of Infinite Words with Automata**

Tim Smith (2016)

arXiv

### **Learning topological defects formation with neural networks in a quantum phase transition**

Han-Qing Shi, Hai-Qing Zhang (2023)

arXiv

### **A Conceptual Development of Quench Prediction App build on LSTM and ELQA framework**

Matej Mertik, Maciej Wielgosz, Andrzej Skocze (2016)

arXiv

### **High-Precision Inversion of Dynamic Radiography Using Hydrodynamic Features**

Maliha Hossain, Balasubramanya T. Nadiga, Oleg Korobkin, Marc L. Klasky, Jennifer L. Schei, Joshua W. Burby, Michael T. McCann, Trevor Wilcox, Soumi De, Charles A. Bouman (2021)

arXiv

### **Physical knowledge improves prediction of EM Fields**

Andrzej Dulny, Farzad Jabbarigargari, Andreas Hotho, Laura Maria Schreiber, Maxim Terekhov, Anna Krause (2025)

arXiv

### **Plasma Surrogate Modelling using Fourier Neural Operators**

Vignesh Gopakumar, Stanislas Pamela, Lorenzo Zanisi, Zongyi Li, Ander Gray, Daniel Brennand, Nitesh Bhatia, Gregory Stathopoulos, Matt Kusner, Marc Peter Deisenroth, Anima Anandkumar, JOREK Team, MAST Team (2024)

arXiv

### **AI-assisted Optimization of the ECCE Tracking System at the Electron Ion Collider**

C. Fanelli, Z. Papandreou, K. Suresh, J. K. Adkins, Y. Akiba, A. Albataineh, M. Amaryan, I. C. Arsene, C. Ayerbe Gayoso, J. Bae, X. Bai, M. D. Baker, M. Bashkanov, R. Bellwied, F. Benmokhtar, V. Berdnikov, J. C. Bernauer, F. Bock, W. Boeglin, M. Borysova, E. Brash, P. Brindza, W. J. Briscoe, M. Brooks, S. Bueltmann, M. H. S. Bukhari, A. Bylinkin, R. Capobianco, W. -C. Chang, Y. Cheon, K. Chen, K. -F. Chen, K. -Y. Cheng, M. Chiu, T. Chujo, Z. Citron, E. Cline, E. Cohen, T. Cormier, Y. Corrales Morales, C. Cotton, J. Crafts, C. Crawford, S. Creekmore, C. Cuevas, J. Cunningham, G. David, C. T. Dean, M. Demarteau, S. Diehl, N. Doshita, R. Dupre, J. M. Durham, R. Dzhygadlo, R. Ehlers, L. El Fassi, A. Emmert, R. Ent, R. Fatemi, S. Fegan, M. Finger, M. Finger Jr., J. Frantz, M. Friedman, I. Friscic, D. Gangadharan, S. Gardner, K. Gates, F. Geurts, R. Gilman, D. Glazier, E. Glimos, Y. Goto, N. Grau, S. V. Greene, A. Q. Guo, L. Guo, S. K. Ha, J. Haggerty, T. Hayward, X. He, O. Hen, D. W. Higinbotham, M. Hoballah, T. Horn, A. Hognmrtsyan, P. -h. J. Hsu, J. Huang, G. Huber, A. Hutson, K. Y. Hwang, C. Hyde, M. Inaba, T. Iwata, H. S. Jo, K. Joo, N. Kalantarians, G. Kalicy, K. Kawade, S. J. D. Kay, A. Kim, B. Kim, C. Kim, M. Kim, Y. Kim, Y. Kim, E. Kistenev, V. Klimenko, S. H. Ko, I. Korover, W. Korsch, G. Krintiras, S. Kuhn, C. -M. Kuo, T. Kutz, J. Lajoie, D. Lawrence, S. Lebedev, H. Lee, J. S. H. Lee, S. W. Lee, Y. -J. Lee, W. Li, W. B. Li, X. Li, X. Li, X. Li, X. Li, Y. T. Liang, S. Lim, C. -h. Lin, D. X. Lin, K. Liu, M. X. Liu, K. Livingston, N. Liyanage, W. J. Llope, C. Loizides, E. Long, R. -S. Lu, Z. Lu, W. Lynch, D. Marchand, M. Marcisovsky, P. Markowitz, H. Marukyan, P. McGaughey, M. Mihovilovic, R. G. Milner, A. Milov, Y. Miyachi, A. Mkrtchyan, P. Monaghan, R. Montgomery, D. Morrison, A. Movsisyan, H. Mkrtchyan, A. Mkrtchyan, C. Munoz Camacho, M. Murray, K. Nagai, J. Nagle, I. Nakagawa, C. Nattrass, D. Nguyen, S. Niccolai, R. Nouicer, G. Nukazuka, M. Nycz, V. A. Okorokov, S. Oresic, J. D. Osborn, C. O'Shaughnessy, S. Paganis, S. F. Pate, M. Patel, C. Paus, G. Penman, M. G. Perdekamp, D. V. Perepelitsa, H. Periera da Costa, K. Peters, W. Phelps, E. Piasetzky, C. Pinkenburg, I. Prochazka, T. Protzman, M. L. Purschke, J. Putschke, J. R. Pybus, R. Rajput-Ghoshal, J. Rasson, B. Raue, K. F. Read, K. Roed, R. Reed, J. Reinhold, E. L. Renner, J. Richards, C. Riedl, T. Rinn, J. Roche, G. M. Roland, G. Ron, M. Rosati, C. Royon, J. Ryu, S. Salur, N. Santiesteban, R. Santos, M. Sarsour, J. Schambach, A. Schmidt, N. Schmidt, C. Schwarz, J. Schwiening, R. Seidl, A. Sickles, P. Simmerling, S. Sirca, D. Sharma, Z. Shi, T. -A. Shibata, C. -W. Shih, S. Shimizu, U. Shrestha, K.

Slifer, K. Smith, D. Sokhan, R. Soltz, W. Sondheim, J. Song, J. Song, I. I. Strakovsky, P. Steinberg, P. Stepanov, J. Stevens, J. Strube, P. Sun, X. Sun, V. Tadevosyan, W. -C. Tang, S. Tapia Araya, S. Tarafdar, L. Teodorescu, A. Timmins, L. Tomasek, N. Trotta, R. Trotta, T. S. Tveter, E. Umaka, A. Usman, H. W. van Hecke, C. Van Hulse, J. Velkovska, E. Voutier, P. K. Wang, Q. Wang, Y. Wang, Y. Wang, D. P. Watts, N. Wickramaarachchi, L. Weinstein, M. Williams, C. -P. Wong, L. Wood, M. H. Wood, C. Woody, B. Wyslouch, Z. Xiao, Y. Yamazaki, Y. Yang, Z. Ye, H. D. Yoo, M. Yurov, N. Zachariou, W. A. Zajc, W. Zha, J. Zhang, Y. Zhang, Y. X. Zhao, X. Zheng, P. Zhuang (2022)  
arXiv

### **A Realistic Collimated X-Ray Image Simulation Pipeline**

Benjamin El-Zein, Dominik Eckert, Thomas Weber, Maximilian Rohleder, Ludwig Ritschl, Steffen Kappler, Andreas Maier (2024)  
arXiv

### **Online Electron Reconstruction at CLAS12**

Tyson, Richard, Gavalian, Gagik (2025)  
EPJ Web Conf.

### **Symplectic machine learning model for fast simulation of space-charge effects**

Wan, Jinyu, Qiang, Ji, Hao, Yue (2025)  
Phys.Rev.Accel.Beams

### **Application of quantum machine learning using variational quantum classifier in accelerator physics**

Yin, He-Xing, Hu, Zhi-Yuan, Zeng, Huan-Huan, Guan, Jia-Bao, Wang, Ji-ke (2025)  
arXiv

### **Laser wakefield electron acceleration simulation using physics-informed diffusion probabilistic models**

Jech, Matej, Kovalenko, Alexander, Lazzarini, Carlo Maria, Grittani, Gabriele Maria (2025)  
Proc.SPIE Int.Soc.Opt.Eng.

### **Geoff: The Generic Optimization Framework & Frontend for Particle Accelerator Controls**

Madysa, Penelope, Appel, Sabrina, Kain, Verena, Schenk, Michael (2025)  
SoftwareX

### **A Start To End Machine Learning Approach To Maximize Scientific Throughput From The LCLS-II-HE**

Mishra, Aashwin, Seaberg, Matt, Roussel, Ryan, Poitevin, Fred, Thayer, Jana, Ratner, Daniel, Edelen, Auralee, Mehta, Apurva (2025)  
arXiv

### **Using a neural network model to guide protection heater design in Nb<sub>3</sub>Sn accelerator magnets**

Bakrani Balani, Shahriar, Salmi, Tiina (2025)  
Supercond.Sci.Technol.

### **Particle identification in the GlueX detector with machine learning**

Habjan, Eric, Dube, Richard, McIntyre, James, Edo, Mezmur, Jones, Richard (2025)  
arXiv

### **Prediction of Radio-quiet Gamma-Ray Pulsar Distances Using the Fundamental Plane Relation**

Angüner, Ekrem O■uzhan (2025)  
Astrophys.J.

### **Graph Neural Networks for particle tracking in NA62 Experiment**

Plini, L., Tinti, G., Spadaro, T., Galasso, F. (2025)  
Nuovo Cim.C

### **Reinforcement Learning for Charged Particle Beam Control to Minimize Injection Mismatch in Particle Accelerators**

Balasoorya, Thilina, Yoo, Shinjae, Schoefer, Vincent, Tseng, Huan-Hsin, Gao, Yuan, Lin, Weijian, Silva, Chanaka De (2025)  
Journal

**Outlook towards deployable continual learning for particle accelerators**

Rajput, Kishansingh, Lin, Sen, Edelen, Auralee, Blokland, Willem, Schram, Malachi (2025)  
Mach.Learn.Sci.Tech.

**An advanced pulse-avalanche stochastic model of long gamma-ray burst light curves**

Maistrello, Manuele, Ferro, Lisa, Bazzanini, Lorenzo, Maccary, Romain, Guidorzi, Cristiano (2025)  
Astron.Astrophys.

**Application of ensemble machine learning algorithms and filtering techniques in slow orbit feedback systems of electron storage rings**

Fan, Jiaqi, Liu, Weibin, Wang, Jiuqing, Wei, Yanru, Wei, Yuanyuan, Ji, Daheng (2025)  
Phys.Rev.Accel.Beams

**Integration of Machine Learning-Based Plasma Acceleration Simulations into Geant4: A Case Study with the PALLAS Experiment**

Sytov, A., Cassou, K., Kubytskyi, V., Lenivenko, M., Huber, A. (2025)  
arXiv

**Optimisation of the Accelerator Control by Reinforcement Learning: A Simulation-Based Approach**

Ibrahim, Anwar, Derkach, Denis, Petrenko, Alexey, Ratnikov, Fedor, Kaledin, Maxim (2025)  
arXiv

**Explainable physics-based constraints on reinforcement learning for accelerator controls**

Colen, Jonathan, Schram, Malachi, Rajput, Kishansingh, Kasparian, Armen (2025)  
arXiv

**femto-PIXAR: a self-supervised neural network method for reconstructing femtosecond X-ray free electron laser pulses**

Goetzke, Gesa, Plumley, Rajan, Hartmann, Gregor, Maxwell, Tim, Decker, Franz-Josef, Lutman, Alberto, Dunne, Mike, Ratner, Daniel, Turner, Joshua J. (2025)  
Opt.Express

**Deep Lie Map Networks: A novel Approach to Infer Nonlinear Synchrotron Optics from Beam Oscillations**

Caliari, Conrad (2025)  
Thesis

**Reconstructing time-of-flight detector values of angular streaking using machine learning**

Meier, David, Viefhaus, Jens, Hartmann, Gregor, Helml, Wolfram, Otto, Thorsten, Sick, Bernhard (2025)  
Phys.Rev.Accel.Beams

**Software Upgrades for the High-Luminosity LHC**

Shope, David Richard (2025)  
PoS

**AI-Enabled Operations at Fermi Complex: Multivariate Time Series Prediction for Outage Prediction and Diagnosis**

Jain, Milan, Mutlu, Burcu O., Stam, Caleb, Strube, Jan, Schupbach, Brian A., John, Jason M.St., Pellico, William A. (2025)  
arXiv

**Machine Learning Methods for Tau Lepton Identification and Search for the Supersymmetric Partner of the Tau Lepton Using CMS Run 2 Data**

Shchedrolosiev, Mykyta (2025)  
Thesis



**Artificial intelligence for advancing particle accelerators**

Ghribi, Adnan, Cassou, Kevin, Dalena, Barbara, Eichler, Annika, Guler, Hayg, Mistry, Andrew K., Oeftiger, Adrian, Shea, Thomas, Valentino, Gianluca, Welsch, Carsten P. (2025)  
Europhys.News

**Electron neutrino selection with deep neural networks for the ICARUS experiment**

Koh, Dae Heun (2025)

Thesis

**Real-Time event reconstruction for Nuclear Physics Experiments using Artificial Intelligence**

Gavalian, Gagik (2025)

EPJ Web Conf.

**Machine Learning for Optimized Polarization at Jefferson Lab**

Jeske, Torri, Kasparian, Armen, Lawrence, David, Britton, Thomas, Schram, Malachi, Moran, Patrick, Fanelli, Cristiano, Guo, Jiawei, Jarvis, Naomi, Maxwell, James, Keith, Chris (2025)

EPJ Web Conf.

**Applying the machine learning methods to determine the linear optics parameters in the ThomX collector ring**

Klekots, D., Bezshyyko, O., Golinka-Bezshyyko, L., Kubytskyi, V., Chaikovska, I. (2024)

Nucl.Phys.Atom.Energy

**Deep learning framework for fault detection in accelerators**

Piekarski, Michal (2024)

JACoW

**Optimizing Beam-Plasma Interactions Through Jitter Analysis Using Start-to-End Simulations**

Hwang, Robin (2024)

arXiv

**Machine Learning Applications for Improving Accelerator Operations**

Lin, Lucy (2024)

Thesis

**Virtual pulse reconstruction diagnostic for single-shot measurement of free electron laser radiation power**

Korten, Till, Rybnikov, Vladimir, Steinbach, Peter, Mirian, Najmeh (2024)

Phys.Rev.Accel.Beams

**Assessing the Performance of Deep Learning Predictions for Dynamic Aperture of a Hadron Circular Particle Accelerator**

Di Croce, Davide, Giovannozzi, Massimo, Montanari, Carlo Emilio, Pieloni, Tatiana, Redaelli, Stefano, Van der Veken, Frederik F. (2024)

Instruments

**Machine learning**

Snuverink, Jochem (2024)

CERN Yellow Rep.School Proc.

**Harnessing Machine Learning for Single-Shot Measurement of Free Electron Laser Pulse Power**

Korten, Till, Rybnikov, Vladimir, Vogt, Mathias, Roensch-Schulenburg, Juliane, Steinbach, Peter, Mirian, Najmeh (2024)

Journal

**Data-driven gradient optimization for field emission management in a superconducting radio-frequency linac**

Goldenberg, Steven, Ahammed, Kawser, Carpenter, Adam, Li, Jiang, Suleiman, Riad, Tennant, Chris (2024)

Phys.Rev.Accel.Beams

### **Third-integer Resonant Extraction Regulation System for Mu2e**

Narayanan, Aakaash (2024)

InspireHEP

### **Harnessing the power of gradient-based simulations for multi-objective optimization in particle accelerators**

Rajput, Kishansingh, Schram, Malachi, Edelen, Auralee, Colen, Jonathan, Kasparian, Armen, Roussel, Ryan, Carpenter, Adam, Zhang, He, Benesch, Jay (2024)

Mach.Learn.Sci.Tech.

### **Machine learning-based non-destructive measurement of bunch length at FRIB**

Wan, Jinyu, Plastun, Alexander, Ostroumov, Peter (2024)

JACoW

### **Beam emittance and Twiss parameters from pepper-pot images using physically informed neural nets**

Knight, Ian, Mustapha, Brahim (2024)

JACoW

### **Advancements in backwards differentiable beam dynamics simulations for accelerator design, model calibration, and machine learning**

Roussel, Ryan, Edelen, Auralee, Gonzalez-Aguilera, Juan Pablo, Lehe, Remi, Huebl, Axel, Kaiser, Jan, Santamaria Garcia, Andrea, Xu, Chenran, Eichler, Annika, Charleux, Grégoire (2024)

JACoW

### **Advanced algorithms for linear accelerator design and operation**

Ong, Ysabella Kassandra, Bellan, Luca, Pisent, Andrea, Comunian, Michele, Fagotti, Enrico, Bortolato, Damiano, Montis, Maurizio, Giacchini, Mauro, Carletto, Osvaldo (2024)

JACoW

### **Adaptive machine learning with hard physics constraints and generative diffusion for 6D phase space diagnostics**

Scheinker, Alexander (2024)

JACoW

### **Data-Driven Discovery of Beam Centroid Dynamics**

Pocher, Liam A., Haber, Irving, Antonsen, Thomas M., O'Shea, Patrick G. (2024)

arXiv

### **Signal model parameter scan using Normalizing Flow**

Saito, Masahiko, Morinaga, Masahiro, Kishimoto, Tomoe, Tanaka, Junichi (2024)

PoS

### **Towards Agentic AI on Particle Accelerators**

Sulc, Antonin, Hellert, Thorsten, Kammering, Raimund, Houscher, Hayden, St. John, Jason (2024)

Journal

### **Machine learning for reducing noise in RF control signals at industrial accelerators**

Henderson, M., Edelen, J.P., Einstein-Curtis, J., Hall, C.C., Cruz, J.A. Diaz, Edelen, A.L. (2024)

JINST

### **Continuous data-driven control of the GTS-LHC ion source at CERN**

Kain, Verena, Rodriguez Mateos, Borja, Bruchon, Niky, Hirlaender, Simon, Küchler, Detlef (2024)

JACoW

### **Surrogate Models studies for laser-plasma accelerator electron source design through numerical optimisation**

Kane, G., Drobniak, P., Kazamias, S., Kubytskyi, V., Lenivenko, M., Lucas, B., Serhal, J., Cassou, K., Beck, A., Specka, A., Massimo, F. (2024)

arXiv

### **Beamline Steering Using Deep Learning Models**

Allen, Dexter, Kante, Isaac, Bohler, Dorian (2024)

arXiv

**Beam-based identification of magnetic field errors in a synchrotron using deep Lie map networks**

Caliari, Conrad, Oeftiger, Adrian, Boine-Frankenheim, Oliver (2024)  
Phys.Rev.Accel.Beams

**Towards efficient machine-learning-based reduction of the cosmic-ray induced background in X-ray imaging detectors: increasing context awareness**

Poliszczyk, Artem, Wilkins, Dan, Allen, Steven W., Miller, Eric D., Chattopadhyay, Tanmoy, Schneider, Benjamin, Darve, Julien Eric, Bautz, Marshall, Falcone, Abe, Foster, Richard, Grant, Catherine E., Herrmann, Sven, Kraft, Ralph, Morris, R. Glenn, Nulsen, Paul, Orel, Peter, Schellenberger, Gerrit, Stueber, Haley R. (2024)  
Proc.SPIE Int.Soc.Opt.Eng.

**A Two-Stage Machine Learning-Aided Approach for Quench Identification at the European XFEL**

Boukela, Lynda, Eichler, Annika, Branlard, Julien, Jomhari, Nur Zulaiha (2024)  
arXiv

**Reinforcement learning-trained optimisers and Bayesian optimisation for online particle accelerator tuning**

Kaiser, Jan, Xu, Chenran, Eichler, Annika, Santamaria Garcia, Andrea, Stein, Oliver, Bründermann, Erik, Kuropka, Willi, Dinter, Hannes, Mayet, Frank, Vinatier, Thomas, Burkart, Florian, Schlarb, Holger (2024)  
Sci.Rep.

**Machine learning-based extraction of longitudinal beam parameters in the LHC**

Iliakis, Konstantinos, Karlsen-Bæck, Birk Emil, Trad, Georges, Timko, Helga, Zampetakis, Michail, Argyropoulos, Theodoros (2024)  
JACoW

**High fidelity numerical modelling and condition monitoring applied to septum magnets at CERN**

Kawa, Krzysztof, Szumlak, Tomasz, Kokkinos, Charilaos, Lackner, Friedrich (2024)  
JACoW

**Updates to Xopt for online accelerator optimization and control**

Roussel, Ryan, Kennedy, Dylan, Boltz, Tobias, Baker, Kathryn, Mayes, Christopher, Edelen, Auralee (2024)  
JACoW

**Breaking new ground in data-intensive science: first insights from the LIV.INNO center for doctoral training**

Welsch, Carsten (2024)  
JACoW

**The reinforcement learning for autonomous accelerators collaboration**

Santamaria Garcia, Andrea, Eichler, Annika, Xu, Chenran, Kaiser, Jan, Scomparin, Luca, Schenk, Michael, Pochaba, Sabrina, Hirlaender, Simon (2024)  
JACoW

**Machine learning-based particle accelerator modeling**

Emmanuel Goutierre (2024)  
Laboratoire Interdisciplinaire des Sciences du Numérique

**Modelization of an Injector With Machine Learning**

Mathieu Debongnie, Maud Baylac, Frédéric Bouly, Nicolas Chauvin, Angélique Gatera, Tomas Junquera, Didier Uriot (2019)  
10th International Particle Accelerator Conference

**Field-Reliability Predictions Based on Statistical System Lifecycle Models**

Lukas Felsberger, Dieter Kranzlmüller, Benjamin Todd (2018)

2nd International Cross-Domain Conference for Machine Learning and Knowledge Extraction (CD-MAKE)

**A Machine Learning Technique for Dynamic Aperture Computation**

Barbara Dalena, Mehdi Ben Ghali (2021)

12th International Particle Accelerator Conference

**Surrogate Model for Linear Accelerator: A fast Neural Network approximation of ThomX's simulator**

Emmanuel Goutierre, Christelle Bruni, Johanne Cohen, Hayg Guler, Michèle Sebag (2023)

IPAC 2023 - 14th International Particle Accelerator Conference

**Physics-aware modelling of an accelerated particle cloud**

Emmanuel Goutierre, Christelle Bruni, Johanne Cohen, Hayg Guler, Michèle Sebag (2023)

MLPS 2023 - Machine Learning and the Physical Sciences Workshop 23023 - At the 37th conference on Neural Information Processing Systems (NeurIPS)

**Closing the loop: Autonomous experiments enabled by machine-learning-based online data analysis in synchrotron beamline environments**

Linus Pithan, Vladimir Starostin, David Mareš, Lukas Petersdorf, Constantin Völter, Valentin Munteanu, Maciej Jankowski, Oleg Kononov, Alexander Gerlach, Alexander Hinderhofer, Bridget Murphy, Stefan Kowarik, Frank Schreiber (2023)

HAL

**Leveraging Subgraph Extraction for Performance Portable Programming Frameworks on DL Accelerators**

Xiao Zhang, Huiying Lan, Tian Zhi (2018)

15th IFIP International Conference on Network and Parallel Computing (NPC)

**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 (2022)

20th Advanced Accelerator Concepts Workshop (AAC'22)

**3D deep convolutional neural network segmentation model for precipitate and porosity identification in synchrotron X-ray tomograms**

S. Gaudez, M. Ben Haj Slama, A. Kaestner, Manas Vijay Upadhyay (2022)

Journal of Synchrotron Radiation

**Leveraging Serial MRI Radiomics and Machine Learning to Predict Risk of Radiation Necrosis in Patients with Brain Metastases Managed with Stereotactic Radiation and Immunotherapy**

H. Elhalawani, L.A. Hammoudeh, D.N. Cagney, J.M. Qian, A. Martin, J. Zgrabik, J. Meyers, K.J. Pataki, K. Martin, Y. Khouj, C. Verry, W.L. Bi, O. Arnaout, S.M. Christ, B. Alexander, S. Tanguturi, R. Rahman, D. Haas-Kogan, A.A. Aizer (2022)

64th ASTRO Annual Meeting

**Neural networks for rapid phase quantification of cultural heritage X-ray powder diffraction data**

Victor Poline, Ravi Raj Purohit, Purushottam Raj Purohit, Pierre Bordet, Nils Blanc, Pauline Martinetto (2024)

Journal of Applied Crystallography

**Understanding error propagation in deep learning neural network (DNN) accelerators and applications**

Guanpeng Li, Siva Kumar Sastry Hari, Michael B. Sullivan, Timothy Tsai, Karthik Pattabiraman, Joel Emer, Stephen W. Keckler (2017)

Unknown Venue

**Survey and Benchmarking of Machine Learning Accelerators**

Albert Reuther, Peter Michaleas, Michael Jones, Vijay Gadepally, Siddharth Samsi, Jeremy Kepner (2019)

Unknown Venue

**A Survey of Accelerator Architectures for Deep Neural Networks**

Yiran Chen, Yuan Xie, Linghao Song, Fan Chen, Tianqi Tang (2020)

Engineering

**RBF neural net based classifier for the AIRIX accelerator fault diagnosis**

J. C. Ribes, G. Delaunay, J. Delvaux, E. Merle, M. Mouillet (2000)

arXiv

**Railway Wheel Impact Force and Alert Prediction Using Machine Learning Models**

Gajendra Malviya, Shripad Salsingkar (2025)

AIRO Springer Series

**RadiSimCLIP: A Radiology Vision-Language Model Pretrained on Simulated Radiologist Learning Dataset for Zero-Shot Medical Image Understanding**

Minhui Tan, Qingxia Wu, Boyang Zhang, Genqiang Ren, Jianlong Nie, Zhong Xue, Xiaohuan Cao, Dinggang Shen (2025)

Lecture Notes in Computer Science

**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)

Information Systems Engineering and Management

**A Living Review Pipeline for AI/ML Applications in Accelerator Physics**

Adnan Ghribi (2025)

arXiv

**A Living Review Pipeline for AI/ML Applications in Accelerator Physics**

Ghribi, Adnan (2025)

arXiv

**Preventive Maintenance of Mining Excavators Using Machine Learning: Enhancing Operational Efficiency and Cost-Effectiveness**

Syed Adnan Ahmad, Prakash Kumar (2025)

Lecture Notes on Multidisciplinary Industrial Engineering

**Steel Surface Defects Recognition Based on Multi-Type Statistical Features and Multiclass Support Vector Machine**

Dibya Tripathi, Kheelraj Pandey, A. K. Chauhan (2025)

Lecture Notes on Multidisciplinary Industrial Engineering

**Prediction of Tensile Strength and Impact Strength in Fused Deposition Modeling Using a Machine Learning Pipeline**

Anne Vogler, Benjamin Küster, Malte Stonis, Ludger Overmeyer (2025)

Lecture Notes in Mechanical Engineering

**TAIDL: Tensor Accelerator ISA Definition Language with Auto-generation of Scalable Test Oracles**

Devansh Jain, Marco Frigo, Jai Arora, Akash Pardeshi, Zhihao Wang, Krut Patel, Charith Mendis (2025)

Proceedings of the 2025 58th IEEE/ACM International Symposium on Microarchitecture

**BitL: A Hybrid Bit-Serial and Parallel Deep Learning Accelerator for Critical Path Reduction**

Seunghyun Lee, Dongho Ha, Sungbin Kim, Sungwoo Kim, Hyunwuk Lee, Won Woo Ro (2025)

Proceedings of the 2025 58th IEEE/ACM International Symposium on Microarchitecture

**Bolt Anchorage Defect Identification Based on Ultrasonic Guided Wave and Deep Learning**

Hui Xing, Weiguo Di, Xiaoyun Sun, Mingming Wang, Chaobo Li (2025)

Sensors

**PSVM-MR: A Parallel Support Vector Machine Algorithm Based on MapReduce**

Bin-bin Guo, Yimin Mao, A Yaser, Neelakandan Chandrasekaran, Le Kang, Wenhao Li, Decheng Miao (2025)

Communications in Computer and Information Science

**DEEP LEARNING-BASED CLASSIFICATION OF SEISMIC DAMAGE ON PARTITION WALL AND ARTIFICIAL CRACKING PATTERN**

Kotoka FUJISAWA, Noriyuki TAKAHASHI (2025)

AIJ Journal of Technology and Design

**Enhancing RFI management in construction through machine learning-driven predictive models**

Neziha Yilmaz, Esin Ergen, Ahmet Muhtar Citipitioglu (2025)

Smart and Sustainable Built Environment

**Digital Twin Framework for PIP-II Linac: AI-Driven Multi-Scale Modeling from Ion Source to 800 MeV**

Pathak, Abhishek, Hanlet, Pierrick, Miceli, Tia (2025)

Journal

**A “Bottom-Up” Approach for Constructing Underground Engineering Knowledge Graph**

Yiming Luo, Yunfei Xiang, Peng Lin, Yong Xia, Yuanguang Liu, Yao Xu, Chaoyi Li (2025)

Mechanisms and Machine Science

**Achievement of High■Quality Gallium Oxide Epitaxial Growth via Machine Learning**

Yaoping Lu, Yu Zhang, Ben Niu, Titao Li, Zhenjie Zheng, Lemin Jia, Duanyang Chen, Hongji Qi, Kelvin H. L. Zhang, Min Zhu, Haizhong Zhang, Xiaoqiang Lu (2025)

Advanced Functional Materials

**Unsupervised Online Learning for AC Optimal Power Flow: A Gradient-Guided Physics-Informed Neural Network Approach**

Bozhen Jiang, Jing Qu, Qin Wang (2025)

Institute of Electrical and Electronics Engineers (IEEE)

**Enhancing Predictive Accuracy in Shear Strength of RC Deep Beams: A Comprehensive Analysis Using Ensemble Machine Learning Models**

Arslan Qayyum Khan, Muhammad Huzaifa Naveed, Muhammad Dawood Rasheed, Amorn Pimanmas (2025)

Arabian Journal for Science and Engineering

**Two-Step Deep Learning Approach for Fine-Grained Railway Catenary Segmentation**

Milo Belien, Metehan Doyran (2025)

Proceedings of the International Workshop on Application-driven Point Cloud Processing and 3D Vision

**Saffron Adulteration Prediction Based on Fine-Grained Deep Features**

Ishrat Nazeer, Ranjeet Kumar Rout, Saiyed Umer (2025)

Lecture Notes in Networks and Systems

**Machine-Learning Approach for Pulsed Electromagnetic Field Therapy Parameters Optimization for Enhanced Tissue Penetration**

Pooja Kumari Jha, Vikas Kumar, Manoj Kumar Parida, S. Kanagaraj (2025)

Lecture Notes in Networks and Systems

**Artificial Intelligence and Machine Learning Based Predictive Modelling of Beam and 3D Bolt Through FEA**

Neha M. Deshmukh, Yashwant S. Munde, Surajit S. Wadagaonkar, Avinash S. Shinde, Prashant R. Anerao (2025)

Lecture Notes in Mechanical Engineering

**Fault Prediction of 5G Base Station RF Module Based on Machine Learning Algorithms**

Mingzan Ning (2025)

Applied and Computational Engineering

**MiMu: mitigating multiple shortcut learning behavior of transformers**

Lili Zhao, Qi Liu, Wei Chen, Liyi Chen, Ruijun Sun, Min Hou, Yang Wang, Shijin Wang, Pingping Ren, Jiafeng Zhou (2025)

Frontiers of Computer Science

**Collective User Behavior Driven Self Learning Search Engine**

Zhiar Piroti (2025)

Springer Science and Business Media LLC

**Reinforcement Learning for Accelerator Beamline Control: a simulation-based approach**

Anwar Ibrahim, Alexey Petrenko, Maxim Kaledin, Ehab Suleiman, Fedor Ratnikov, Denis Derkach (2025)

arXiv

**Reinforcement Learning for Accelerator Beamline Control: a simulation-based approach**

Ibrahim, Anwar, Petrenko, Alexey, Kaledin, Maxim, Suleiman, Ehab, Ratnikov, Fedor, Derkach, Denis (2025)

arXiv

**Automated beam tuning of the TRIUMF ISAC facility**

Shelbaya, Olivier, Jung, Paul, Kester, Oliver, Hassan, Omar (2025)

JACoW

**Deep Learning-Based Classification of Spine X-Ray Images Using Attention Mechanisms**

Asaram Pandurang Janwale, Minal Dutta, Savita Mohurle, Vaduguru Venkata Ramya (2025)

Lecture Notes in Networks and Systems

**Abstract 4345868: Machine learning prediction of myocardial ischemia using quantitative assessment of coronary calcifications in non-contrast CT calcium scoring scans**

Juhwan Lee, Mohamed H.E. Makhlof, Sadeer Al-Kindi, Ammar Hoori, Tao Hu, Hao Wu, Justin Kim, Sanjay Rajagopalan, David Wilson (2025)

Circulation

**A data-driven hybrid method combining experiments, finite element modeling and machine learning for impact response prediction of TPU composites**

Shunqi Zhang, Luca Lomazzi, Dayou Ma, Andrea Manes (2025)

International Journal of Structural Integrity

**Human-in-the-loop reinforcement learning for data quality monitoring in particle physics experiments**

Olivia Jullian Parra, Julián García Pardiñas, Lorenzo Del Pianta Pérez, Maximilian Janisch, Suzanne Klaver, Thomas Lehericy, Nicola Serra (2025)

Machine Learning: Science and Technology

**ESTIMATIVA DE VIDA ÚTIL REMANESCENTE DE PLACAS CERÂMICAS UTILIZADAS EM FILTRAGEM DE MINÉRIO DE FERRO ATRAVÉS DE MODELO DE CONFIABILIDADE E MÉTODOS DE MACHINE LEARNING APLICADOS A VARIÁVEIS DE PROCESSO INDUSTRIAL DE UM SISTEMA PIMS**

ROBERT BENTO FLORENTINO, LUIZ GUSTAVO LOURENÇO MOURA (2025)

Anais do Encontro Nacional de Engenharia de Produção

**Reinforcement Learning for Accelerator Beamline Control: a simulation-based approach**

Ibrahim Anwar, Petrenko, Alexey, Kaledin, Maxim, Suleiman, Ehab, Ratnikov, Fedor, Derkach Denis (2025)

arXiv (Cornell University)

**A Machine Learning Approach to Li-Ion Battery Module**

Ram U. Kalyankar, Kalpak R. Sagar, Vipul M. Patel, Jyotirmay Banerjee, Hemantkumar B. Mehta

(2025)

Lecture Notes in Mechanical Engineering

### **An Overview of Artificial Intelligence and Machine Learning**

Adwika Singh, Falguni Sharma, Anshuman Shastri (2025)

Artificial Intelligence for Biomass-based Biofuel Production

### **IGD-YOLOv8s: insulator defect detection via iterative attention and generalized dynamic feature pyramids**

Zhiqin Zhang, Guowu Yuan, Junlin Rao, Xiang Li, Pengfei Yu, Hao Zhou (2025)

Measurement Science and Technology

### **A Teachable Machine for Transformers**

Nicolas Pope, Matti Tedre (2025)

Proceedings of the 25th Koli Calling International Conference on Computing Education Research

### **Predictive Modeling of ICU Mortality Using Supervised Machine Learning Algorithms**

Malithi Upeksha, Sulanie Perera (2025)

Communications in Computer and Information Science

### **SABER: Symbolic Regression-based Angle of Arrival and Beam Pattern Estimator**

Shih-Kai Chou, Mengran Zhao, Cheng-Nan Hu, Kuang-Chung Chou, Carolina Fortuna, Jernej Hribar (2025)

arXiv

### **Machine learning-driven optimization of energy absorption in PLA composites reinforced with carbon fibers through FFF additive manufacturing**

Rezgar Hasanzadeh (2025)

Rapid Prototyping Journal

### **Beam Energy Forecasting using Machine Learning at the CLEAR accelerator**

Gilardi, Antonio, Malyzhenkov, Alexander, Petersson, Alfred, Mostacci Andrea, Pollastro, Andrea, Aksoy, Avni, Filippetto, Daniele, Gamba, Davide, Granados, Eduardo, Tangari, Giacomo, Sjobak, Kyrre, Bonnard, Ladislav, Wroe, Laurence, Carranza-García, Manuel, Franek Ondrej, Korysko, Pierre, Corsini Roberto, Rieker, Vilde, Farabolini, Wilfrid, Mazzoni, Stefano (2025)

JACOW

### **Advancing accelerator science through data-intensive research and training**

Welsch, Carsten (2025)

JACOW

### **Machine learning approach to MDI optimization for 3 TeV c.o.m. Muon Collider**

Castelli, Luca (2025)

JACOW

### **Advances in machine learning inference of dynamic aperture evaluation for the LHC**

Montanari, Carlo Emilio, Di Croce, Davide, Van der Veken, Frederik, Giovannozzi, Massimo, Appleby, Robert, Redaelli, Stefano, Pieloni, Tatiana (2025)

JACOW

### **Machine learning for calibration drift forecasting in superconducting RF cavities**

Sun Yue, Bellandi Andrea, Eichler, Annika, Richter, Bozo, Diomedede, Marco, Schmidt, Christian, Schlarb Holger, Branlard, Julien, Herrmann, Max (2025)

JACOW

### **Uncertainty-Quantified Machine Model Construction Using Physics-Informed Gaussian Processes and Bayesian Optimization**

Isensee, Victoria, Oeftiger, Adrian, Boine-Frankenheim, Oliver (2025)

JACOW

### **Physics-Informed Deep Learning for Improved Input Function Estimation in Motion-Blurred Dynamic $^{18}\text{F}$ FDG PET Images**

Christian Salomonsen, Kristoffer K. Wickstrøm, Samuel Kuttner, Elisabeth Wetzer (2025)



Lecture Notes in Computer Science

**Fusion model combining ultrasound-based radiomics and deep transfer learning with clinical parameters for preoperative prediction of pelvic lymph node metastasis in cervical cancer**

Jihan Wang, Shengxian Bao, Tongtong Huang, Yongzhi Cai, Binbin Jin, Ji Wu (2025)

Frontiers in Oncology

**Hybrid Machine Learning based Optimization with Beamforming of 6G Mobile Radio Network for LEO Satellite base station in Urban Areas**

Haymanot Derebe Bizuneh (2025)

Springer Science and Business Media LLC

**Fluence Map Prediction with Deep Learning: A Transformer-based Approach**

Ujunwa Mgbob, Rafi Sultan, Dongxiao Zhu, Joshua Kim (2025)

arXiv

**Machine Learning in High-Momentum Particle Identification in the MPD Experiment**

Papoyan, V., Aparin, A., Ayriyan, A., Grigorian, H., Korobitsin, A. (2025)

Phys.Part.Nucl.

**ChatEED: An agentic retrieval assistant for accelerator operators**

Aaron Zachary Reed, Claudio Bisegni, Sandesh Shrestha, Michelle Huang, Daniel Ratner (2025)

Proceedings of the SC '25 Workshops of the International Conference for High Performance Computing, Networking, Storage and Analysis

**Machine Learning in Semiconductor Failure Analysis: Techniques and Case Studies (2025 Update)**

Michael Kögel, Sebastian Brand, Frank Altmann (2025)

International Symposium for Testing and Failure Analysis

**NNia-8: An 8-Core RISC-V Neural Network Inference Accelerator with Efficient Processing Elements and Memory Utilization**

Xingbo Wang, Yucong Huang, Xinyu Kang, Yuru Li, Qi Wang, Terry Tao Ye (2025)

Lecture Notes in Computer Science

**Railway Track Obstacle Detection and Alert System Using Deep Learning**

R. Anand, D. P. Monish, D. Madhukar, C. G. Paari (2025)

Lecture Notes in Networks and Systems

**Deep Learning Assisted Modeling for  $\chi^2$  Nonlinear Optics**

Jack Hirschman, Erfan Abedi, Minyang Wang, Hao Zhang, Abhimanyu Borthakur, Justin Baker, Andrea L. Bertozzi, Randy Lemons, Sergio Carbajo (2025)

arXiv

**Robust Training to Secure Automated AI Accelerator Generation Against Malicious Platforms**

Chao Guo, Youhua Shi (2025)

Communications in Computer and Information Science

**Machine learning with ultrasound examination for prediction of intraoperative hypotension during robot-assisted radical prostatectomy**

V. S. Andreenkov, A. V. Vlasenko, A. N. Kornienko, A. S. Kazakov, E. P. Rodionov, K. B.

Kolontarev, E. A. Evdokimov (2025)

Medical alphabet

**Categories of Defect Prediction**

Zhou Xu (2025)

Machine-Learning-Assisted Software Defect Prediction

**Optimized Supervised Machine Learning for Accurate Estimation of Reinforcement in RC Beams and Columns**

Nhan Thanh Vu Nguyen, Chon Tran, Duong Thai Le, Quy Thue Nguyen (2025)  
Lecture Notes in Civil Engineering

**Radial Pulse Pattern Recognition Using Deep Learning**

Nishant Patil, Ghanshyam Jindal, Sanjeev Rai, Gajanan Nagare (2025)  
Lecture Notes in Networks and Systems

**Measurement and Evaluation of Intelligent Robots**

Claude Sammut (2025)  
Lecture Notes in Computer Science

**Parameter estimation of three-phase voltage source converter using physics-informed machine learning**

Cuiyu Liu, Zhiming Yang, Yipeng Yang, Ziwen Xiao, Chuanfeng Li, Yang Yu (2025)  
Measurement Science and Technology

**Automated RF Phase Adjustment for Beam Stabilization in the Fermilab Linac**

R. R. Chichili, J. A. Sulskis, R. Sharankova, B. Vamanan, S. Ravi (2025)  
arXiv

**Fast Adaptive Neural Control of Resonant Extraction at Fermilab**

A. Whitbeck, J. Berlioz, K. Danison-Fieldhouse, K. Hazelwood, M. Khan, J. Mitrevski, A. Narayanan, J. St. John, N. Tran, J. Ji, M. Walter (2025)  
arXiv

**Hybrid deep semantic query expansion using multi-objective fireworks-transformer optimization: a reinforcement learning approach**

Fouad Bekkari, Med Redouane Kafi, Amine Khaldi (2025)  
Evolutionary Intelligence

**Automated RF Phase Adjustment for Beam Stabilization in the Fermilab Linac**

Chichili, R.R., Sulskis, J.A., Sharankova, R., Vamanan, B., Ravi, S. (2025)  
Journal

**Fast Adaptive Neural Control of Resonant Extraction at Fermilab**

Whitbeck, A., Berlioz, J., Danison-Fieldhouse, K., Hazelwood, K., Khan, M., Mitrevski, J., Narayanan, A., John, J.St., Tran, N., Ji, J., Walter, M. (2025)  
Journal

**Study on estimation of internal cracks using electromagnetic waves and machine learning**

Hinata Yamamoto, Hitoshi Ito, Toshiaki Mizobuchi (2025)  
Proceedings of the Institution of Civil Engineers - Construction Materials

**A New Pulsed Neutron-Gamma Density Logging Method Based on Gamma-Ray Spectra and Machine Learning**

Duo Dong, Qiong Zhang, Defu Zang, Wensheng Wu, He Meng, Yunlong Ge, Hu Wang, Xiaoyu Song, Shitao Xiong (2025)  
ACS Omega

**Figure S3 from Building Practical Risk Prediction Models for Nasopharyngeal Carcinoma Screening with Patient Graph Analysis and Machine Learning**

Anjun Chen, Roufeng Lu, Ruobing Han, Ran Huang, Guanjie Qin, Jian Wen, Qinghua Li, Zhiyong Zhang, Wei Jiang (2025)  
American Association for Cancer Research (AACR)

**Innovative Approaches for Learning Electrical Concepts in Physics**

Papun Mondal, Sanjoy Kumar Pal, Pradipta Panchadhyayee, Suman Kumar Dash, Subhash Chandra Samanta (2025)  
Resonance

**A study on sex prediction by using machine algorithms with anthropometric measurements of the seventh cervical vertebra**

Esra Cetin Unlu, Zulal Oner, Serkan Oner, Muhammed Kamil Turan, Rukiye Sumeyye Bakici (2025)

Anthropologischer Anzeiger

**Machine learning model for predicting the magnitude of tumor movement based on clinical information and CT-based radiomics features**

Xinyu Song, Lian Duan, Guangyu Wang, Xiangyu Zhang, Qing Xiao, Guyu Dai, Jing Li, Yinglin Peng, Sen Bai, Guangjun Li (2025)

Applied Radiation and Isotopes

**Integrated engineering framework for fatigue damage prediction of fighter aircraft using machine learning**

Zahid Ahmad, Ghulam Murtaza Amjad, Mian Ashfaq Ali, Faisal Siddiqui, Aamir Mubashar, Muhammad Ahsan (2025)

Results in Engineering

**PREDICTING SUSPECTED RADIATION NECROSIS IN BRAIN CANCER PATIENTS WITH A MACHINE LEARNING MODEL BASED ON THE PROTON LINEAL ENERGY SPECTRUM**

Mark Newpower, Joseph Decunha, Radhe Mohan, Erik Traneus, Ozer Algan, Jerry Jaboin (2025)

International Journal of Particle Therapy

**First Experimental Demonstration of Machine Learning-Based Tuning on the PSI Injector 2 Cyclotron**

M. Haj Tahar, W. Joho, E. Solodko, M. Bocchio, S. Marquie, M. Busch, A. Barchetti, J.

Grillenberger, J. Snuverink, M. Schneider (2025)

arXiv

**Machine Learning-Based Prediction of Mechanical Properties of Recycled Aggregate Concrete**

Dr. Chethan L S, Akash H E, Sanketh M B, Chinmay k karatekar, Revanth Kumar (2025)

International Journal of Scientific Research in Engineering and Management

**First Experimental Demonstration of Machine Learning-Based Tuning on the PSI Injector 2 Cyclotron**

Haj Tahar, M., Joho, W., Solodko, E., Bocchio, M., Marquie, S., Busch, M., Barchetti, A.,

Grillenberger, J., Snuverink, J., Schneider, M. (2025)

arXiv

**First Experimental Demonstration of Machine Learning-Based Tuning on the PSI Injector 2 Cyclotron**

Sandrine Marquié (2025)

arXiv (Cornell University)

**Xopt and Badger: a machine learning ecosystem for real-time accelerator control and optimization**

Roussel, Ryan, Kennedy, Dylan, Edelen, Auralee, Kuklev, Nikita, Miskovich, Sara, Zhang Zhe (2025)

JACOW

**Long short-term memory of recurrent neural network to the analysis of temperature rise on the production target in Hadron Experimental Facility of J-PARC**

Agari Keizo, Sato Yoshinori, Toyoda Akihisa, Morino Yuhei, Akiyama Hironobu (2025)

JACOW

**Health state assessment of air compressor based on stacking ensemble learning**

Dali Hou, Zhengrong Yang, Xiaoran Wang (2025)

Journal of Mechanical Science and Technology

**Particle Tracking in the NA62 Experiment**

Plini, Leonardo, Tinti, Gemma, Spadaro, Tommaso, Spinelli, Indro, Galasso, Fabio (2025)

PoS

**Reconstruction of Neutron Spectra Using Silicon Carbide Detectors in Monoenergetic Fields with Machine Learning Approach**

Enrica Belfiore, Achment Chalil, Mehdi Ben Mosbah, Rodolphe Antoni, Olivier Llido, Abdallah Lyoussi, Christophe Destouches, Tomáš Slavíček, Andrea Šagátová, Jean-Emmanuel Groetz (2025)

Springer Link (Chiba Institute of Technology)

**Signal increase ratio prediction with CNNs**

Marius Zeinhofer, Kent-Andre Mardal (2025)

Simula SpringerBriefs on Computing

**Revolutionary Engineers: Learning, Politics, and Activism at Aryamehr University of Technology. Sepehr Vakil, Mahdi Ganjavi, and Mina Khanlarzadeh (Cambridge, MA: MIT Press, 2025). Pp. 236. \$50 paper. ISBN 9780262552196**

Timothy Nunan (2025)

International Journal of Middle East Studies

**Photonic Quantum-Accelerated Machine Learning**

Rambach, Markus, Roy Abhishek, Gilchrist, Alexei, Sakurai, Akitada, Munro, William J., Nemoto Kae, White, Andrew G. (2025)

arXiv (Cornell University)

**Photonic Quantum-Accelerated Machine Learning**

Rambach, Markus, Roy Abhishek, Gilchrist, Alexei, Sakurai, Akitada, Munro, William J., Nemoto Kae, White, Andrew G. (2025)

arXiv (Cornell University)

**Autonomous Pressure Control in MuVacAS via Deep Reinforcement Learning and Deep Learning Surrogate Models**

Guillermo Rodriguez-Llorente, Galo Gallardo, Rodrigo Morant Navascués, Nikita Khvatkin

Petrovsky, Anderson Sabogal, Roberto Gómez-Espinosa Martín (2025)

arXiv

**Machine learning-based prediction of magnet errors in storage ring light sources**

Jianhao Xu (2025)

arXiv

**ColliderML: The First Release of an OpenDataDetector High-Luminosity Physics Benchmark Dataset**

Dozza Elitez, Paul Gessinger, Daniel Murnane, Marcus Selchou Raaholt, Andreas Salzburger, Stine Kofoed Skov, Andreas Stefl, Anna Zaborowska (2025)

arXiv

**Machine learning-based prediction of magnet errors in storage ring light sources**

Xu, Jianhao (2025)

arXiv

**Autonomous Pressure Control in MuVacAS via Deep Reinforcement Learning and Deep Learning Surrogate Models**

Rodriguez-Llorente, Guillermo, Gallardo, Galo, Navascués, Rodrigo Morant, Petrovsky, Nikita Khvatkin, Sabogal, Anderson, Martín, Roberto Gómez-Espinosa (2025)

arXiv