

Contents

Vol. 79, Suppl. 2, 2024

Special Issue: Deep Learning in Computational Physics

Application of Kolmogorov–Arnold Networks in High Energy Physics <i>E. E. Abasov, P. V. Volkov, G. A. Vorotnikov, L. V. Dudko, A. D. Zaborenko, E. S. Iudin, A. A. Markina, and M. A. Perfilov</i>	S585
Calibrating for the Future: Enhancing Calorimeter Longevity with Deep Learning <i>S. Ali, A. S. Ryzhikov, D. A. Derkach, F. D. Ratnikov, and V. O. Bocharnikov</i>	S591
Image Data Augmentation for the TAIGA-IACT Experiment with Conditional Generative Adversarial Networks <i>Yu. Yu. Dubenskaya, A. P. Kryukov, E. O. Gres, S. P. Polyakov, E. B. Postnikov, P. A. Volchugov, A. A. Vlaskina, and D. P. Zhurov</i>	S598
Machine Learning Approach in the Prediction of Differential Cross Sections and Structure Functions of Single Pion Electroproduction in the Resonance Region <i>A. V. Golda, A. A. Rusova, E. L. Isupov, and V. V. Chistyakova</i>	S608
Gamma/Hadron Separation in the TAIGA Experiment with Neural Network Methods <i>E. O. Gres, A. P. Kryukov, P. A. Volchugov, J. J. Dubenskaya, D. P. Zhurov, S. P. Polyakov, E. B. Postnikov, and A. A. Vlaskina</i>	S622
Encoding of Input Signals in Terms of Path Complexes in Spiking Neural Networks <i>V. A. Ilyin, Ya. P. Ivina, M. Yu. Khristichenko, A. V. Serenko, and R. B. Rybka</i>	S630
Application of Neural Networks for Path Integrals Computation in Relativistic Quantum Mechanics <i>D. V. Salnikov, V. V. Chistiakov, A. V. Vasiliev, and A. S. Ivanov</i>	S639
Enhanced Image Clustering with Random-Bond Ising Models Using LDPC Graph Representations and Nishimori Temperature <i>V. S. Usatyuk, D. A. Sapozhnikov, and S. I. Egorov</i>	S647
Neural Network Modeling of Optical Solitons Described by Generalized Nonlinear Schrödinger Equations <i>S. V. Zavertyaev, I. A. Moloshnikov, A. G. Sboev, and M. S. Kuvakin</i>	S666
Application of Convolutional Neural Networks for Extensive Air Shower Separation in the SPHERE-3 Experiment <i>E. L. Entina, D. A. Podgrudkov, C. G. Azra, E. A. Bonvech, O. V. Cherkesova, D. V. Chernov, V. I. Galkin, V. A. Ivanov, T. A. Kolodkin, N. O. Ovcharenko, T. M. Roganova, and M. D. Ziva</i>	S676
Generation of Grid Surface Detector Data in the Telescope Array Experiment Using Neural Networks <i>R. R. Fitagdinov and I. V. Kharuk</i>	S684
Machine Learning in Gamma Astronomy <i>A. P. Kryukov, A. P. Demichev, and V. A. Ilyin</i>	S690

Multidimensional Global Optimization of Detector Systems Using the Example of Muon Shield in the SHiP Experiment <i>E. O. Kurbatov, F. D. Ratnikov, and E. D. Ursov</i>	S700
Solving Problems of Mathematical Physics on Radial Basis Function Networks <i>D. A. Stenkin and V. I. Gorbachenko</i>	S706
Reconstruction of Energy and Arrival Directions of UHECRs Registered by Fluorescence Telescopes with Neural Networks <i>Mikhail Zotov</i> <i>(for the JEM-EUSO Collaboration)</i>	S712
Evaluating EAS Directions from TAIGA HiSCORE Data Using Fully Connected Neural Networks <i>A. P. Kryukov, S. P. Polyakov, Yu. Yu. Dubenskaya, E. O. Gres, E. B. Postnikov, P. A. Volchugov, and D. P. Zhurov</i>	S724
Identification of Air Pollutants with Thermally Modulated Metal Oxide Semiconductor Gas Sensors through Machine Learning Based Response Models <i>I. V. Isaev, K. N. Chernov, A. S. Sagitova, V. V. Krivetskiy, and S. A. Dolenko</i>	S731
An Overview of Machine Learning and Deep Learning Applications in Earth Sciences in 2024: Achievements and Perspectives <i>M. A. Krinitskiy</i>	S739
Pointwise and Complex Quality Metrics in Atmospheric Modeling: Methods and Approaches <i>V. Yu. Rezvov, M. A. Krinitskiy, and M. A. Borisov</i>	S750
Probabilistic Programming Methods for Reconstruction of Multichannel Imaging Detector Events: ELVES and TRACKS <i>S. A. Sharakin and R. E. Saraev</i>	S765
Machine Learning Methods for Statistical Prediction of PM _{2.5} in Urban Agglomerations with Complex Terrain, Using Grenoble As an Example <i>A. I. Suslov, M. A. Krinitskiy, C. Staquet, and E. Le Boudec</i>	S774
Approximation of Spatial and Temporal Variability of the Urban Heat Island in Moscow Using Machine Learning <i>M. I. Varentsov, M. A. Krinitskiy, and V. M. Stepanenko</i>	S784
Forecasting the State of the Earth's Magnetosphere Using a Special Algorithm for Working with Multidimensional Time Series <i>R. D. Vladimirov, V. R. Shirokiy, O. G. Barinov, S. A. Dolenko, and I. N. Myagkova</i>	S798
Diagnostics of Geinduced Currents in High Latitude Power Systems Using Machine Learning Methods <i>A. V. Vorobev and G. R. Vorobeva</i>	S807
Engineering Point Defects in MoS ₂ for Tailored Material Properties Using Large Language Models <i>Abdalaziz Al-Maeni, Denis Derkach, and Andrey Ustyuzhanin</i>	S818
A Transformer Architecture for Risk Analysis of Group Effects of Food Nutrients <i>A. N. Balandina, B. V. Gruzdev, N. A. Savelev, Y. S. Budakyan, S. I. Kisil, A. R. Bogdanov, and E. A. Grachev</i>	S828

Development of a Multimodal Photoluminescent Carbon Nanosensor for Metal Ions in Water Using Artificial Neural Networks <i>G. N. Chugreeva, K. A. Laptinskiy, I. V. Plastinin, O. E. Sarmanova, and T. A. Dolenko</i>	S844
Comparative Analysis of the Procedures to Forecast the Kp Geomagnetic Index by Machine Learning <i>I. M. Gadzhiev, O. G. Barinov, S. A. Dolenko, and I. N. Myagkova</i>	S854
Prediction of Defect Structure in MoS ₂ by Given Properties <i>H. E. Karlinski and M. V. Lazarev</i>	S866
Feature Selection Methods for Deep Learning Models of Soft Sensors in Oil Refining <i>I. S. Lazukhin, M. I. Petrovskiy, and I. V. Mashechkin</i>	S872
An Original Algorithm for Classifying Premotor Potentials in Electroencephalogram Signal for Neurorehabilitation Using a Closed-Loop Brain–Computer Interface <i>A. I. Saevskiy, I. E. Shepelev, and I. V. Shcherban</i>	S890
Nonlinear Relevance Estimation of Multicollinear Features for Reducing the Input Dimensionality of Optical Spectroscopy Inverse Problem <i>N. O. Shchurov, I. V. Isaev, S. A. Burikov, K. A. Laptinskiy, O. E. Sarmanova, T. A. Dolenko, and S. A. Dolenko</i>	S898
Machine Learning for FARICH Reconstruction at NICA SPD <i>F. Shipilov, A. Barnyakov, A. Ivanov, and F. Ratnikov</i>	S906
Improving Physics-Informed Neural Networks via Quasiclassical Loss Functionals <i>S. G. Shorokhov</i>	S914
Neural Operators for Hydrodynamic Modeling of Underground Gas Storages <i>D. D. Sirota, K. A. Gushchin, S. A. Khan, S. L. Kostikov, and K. A. Butov</i>	S922
Gaussian Process Based Prediction of Density Distribution in Core of Research Nuclear Reactor <i>N. V. Smolnikov, M. N. Anikin, A. G. Naimushin, and I. I. Lebedev</i>	S935
Spiking Neural Network Actor–Critic Reinforcement Learning with Temporal Coding and Reward-Modulated Plasticity <i>D. S. Vlasov, R. B. Rybka, A. V. Serenko, and A. G. Sboev</i>	S944
