

In total: **175** publications, among them **9** books and **166** articles on  
*mathematical physics, quantum computing, signal processing and DNA structure*

## Publications by Steven Duplij/Stepan Douplii (1985-2025)

- [1] S. Duplij, N. Fu, and Q. Guo, *Cryptographic transformations over polyadic rings*, Res. Inst., HEU, arXiv: 2512.12580 [cs.CR], Yantai, 2025, 9 p.
- [2] S. Duplij, *Higher power polyadic group rings*, Univ. Münster, CIT, arXiv: 2510.14029 [math.RA], Münster, 2025, 18 p.
- [3] S. Duplij and Q. Guo, *Polyadic encryption*, Axioms **14** (2025), 835 (Special issue *Computational Algebra, Coding Theory and Cryptography: Theory and Applications, 2nd Edition*).
- [4] S. Duplij, *Positional numeral systems over polyadic rings*, Univ. Münster, CIT, arXiv: 2506.12930 [math.NT], Münster, 2025, 13 p.
- [5] S. Duplij, *Polyadic supersymmetry*, Universe **11** (2025), 125.
- [6] S. Duplij, *Supergravity was discovered by D.V. Volkov and V.A. Soroka in 1973*, in The Supersymmetric World: The Beginnings of the Theory, G. Kane and M. Shifman, eds., World Scientific, Singapore, 2025, pp. 371–373.
- [7] Q. Guo, M. Fang, S. Douplii, and Y. Wang, *Pattern synthesis of sparse linear arrays based on the atomic norm minimization and alternating direction method of multipliers approach*, Digital Signal Process. **162** (2025), 105160.
- [8] S. Huang, T. Xu, Q. Guo, and S. Douplii, *A radar signal sorting method based on the graph neural network combined with GCN and GAT*, in 2025 26th International Radar Symposium (IRS), IEEE, Hamburg, 2025, pp. 7–12 (<https://ieeexplore.ieee.org/document/11046170>).
- [9] Q. Guo, S. Huang, L.-C. Liu, M. Kaliuzhnyi, and S. Douplii, *A radar signal deinterleaving method based on enhanced sparse subspace clustering*, IEEE Trans. Aerosp. Electron. Syst. **61** (2025), 2956–2972.
- [10] Q. Guo, B. Na, and S. Douplii, *An HF channel parameter estimation method based on HR-IPFrFT*, Adv. Space Research **75** (2025), 7624–7644.
- [11] Y. Tian, Q. Guo, L. Liu, and S. Douplii, *A SAR RFI suppression method based on low-rank guided CUR decomposition in complex electromagnetic environment*, in 2025 26th International Radar Symposium (IRS), IEEE, Hamburg, 2025, pp. 1–6 (<https://ieeexplore.ieee.org/document/11046141>).
- [12] S. Duplij, *Hyperpolyadic structures*, Mathematics **12** (2024), 2378.
- [13] S. Duplij, *Polyadic sigma matrices*, J. Math. Phys. **65** (2024), 083509.

- [14] Q. Guo, W. Zhao, L. Qi, Y. Wang, M. Kaliuzhnyi, and S. Duplij, *Method for DOA estimation of coprime arrays through joint auxiliary arrays with atomic norm minimization in the presence of gain-phase errors*, Circuits Syst. Signal Process. **43** (2024), 6637–6660.
- [15] S. Duplij, *Polyadic supersymmetry*, Univ. Münster, CIT, hep-th/2406.02188, Münster, 2024, 14 p.
- [16] V. P. Duplij, N. V. Duplii, and S. Duplij, *DNA walk diagram in Triander and jsTriander applications*, Plant Phys. Genet. (Fiziol. rast. genet.) **56** (2024), 353–361.
- [17] S. Duplij and R. Vogl, **Innovative Quantum Computing**, IOP Publishing, Bristol-London, 2023.
- [18] S. Duplij and R. Vogl, *On superqubits*, Univ. Münster, CIT, quant-ph/2310.09635, Münster, 2023, 14 p.
- [19] S. Duplij and R. Vogl, *Polyander visualization of quantum walks*, Univ. Münster, CIT, quant-ph/2311.00409, Münster, 2023, 12 p.
- [20] S. Duplij, **Polyadic Algebraic Structures**, IOP Publishing, London-Bristol, 2022, 461 pp.
- [21] S. Duplij, *Polyadic analogs of direct product*, Universe **8** (2022), 230.
- [22] S. Duplij, *Polyadic rings of  $p$ -adic integers*, Symmetry **14** (2022), 2591.
- [23] S. Duplij, *Polyadization of algebraic structures*, Symmetry **14** (2022), 1782.
- [24] M. L. Walker and S. Duplij, *Gauge gravity vacuum in constraintless Clairaut-type formalism*, Universe **8** (2022), 176.
- [25] **Selected Topics in Gravity, Field Theory and Quantum Mechanics**, S. Duplij and M. L. Walker, eds., MDPI Books, Basel, 2022.
- [26] S. Duplij, *Higher regularity, inverse and polyadic semigroups*, Universe **7** (2021), 379.
- [27] S. Duplij, *Graded medial  $n$ -ary algebras and polyadic tensor categories*, Symmetry **13** (2021), 1038.
- [28] S. Duplij, *Higher braid groups and regular semigroups from polyadic-binary correspondence*, Mathematics **9** (2021), 972.
- [29] S. Duplij, *Membership deformation of commutativity and obscure  $n$ -ary algebras*, J. Math. Physics, Analysis, Geometry **17** (2021), 441–462.
- [30] S. Duplij, *Polyadic Hopf algebras and quantum groups*, East European J. Phys. **2** (2021), 5–50.
- [31] S. Duplij and R. Vogl, *Obscure qubits and membership amplitudes*, in Topics on Quantum Information Science, S. Curilef and A. R. Plastino, eds., IntechOpen, London, 2021, p. 20 pp.
- [32] S. Duplij and R. Vogl, *Polyadic braid operators and higher braiding gates*, Universe **7** (2021), 301.

- [33] S. Duplij and W. Werner, *Structure of unital 3-fields*, Math. Semesterber. **68** (2021), 27–53.
- [34] A. J. Bruce and S. Duplij, *Double-graded quantum superplane*, Rep. Math. Phys. **86** (2020), 383–400.
- [35] A. J. Bruce and S. Duplij, *Double-graded supersymmetric quantum mechanics*, J. Math. Phys. **61** (2020), 063503, 13.
- [36] S. Duplij and R. Vogl, *Membership amplitudes and obscure qudits*, Univ. Münster, arXiv: math.GR/2102.04433, Münster, 2020, 17 p.
- [37] A. J. Bruce and S. Duplij, *Double-graded quantum superplane*, Univ. Luxembourg, arXiv:1910.12950, Luxembourg, 2019.
- [38] S. Duplij, *Arity shape of polyadic algebraic structures*, J. Math. Physics, Analysis, Geometry **15** (2019), 3–56.
- [39] S. Duplij, *Coderivations and codifferential calculi on finite groups*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 145–160.
- [40] S. Duplij, *Constraintless hamiltonian formalism and new brackets*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 197–230.
- [41] S. Duplij, **Exotic Algebraic and Geometric Structures in Theoretical Physics**, Nova Publishers, New York, 2018.
- [42] S. Duplij, *Polyadic algebraic structures and their representations*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 251–308 (arXiv:math.RT/1308.4060).
- [43] S. Duplij, *Polyadic Hopf algebras and quantum groups*, Math. Inst., arXiv: math.RA/1811.02712, Münster, 2018, 57 p.
- [44] S. Duplij, **Supersymmetry, Quantum Groups, Multigravity and Singular Theories**, Central West Publishing, Australia, 2018, 254 pp.
- [45] S. Duplij, *Ternary Hopf algebras and quantum groups*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 309–321.
- [46] S. Duplij and W. Marcinek, *Braid semistatistics and doubly regular R-matrix*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 77–86.
- [47] S. Duplij and W. Marcinek, *Higher regularity and obstructed categories*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 15–24.
- [48] S. Duplij and W. Marcinek, *Semisupermanifolds and regularization*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 1–12.

- [49] S. Duplij and W. Marcinek, *Toposes and categories in quantum theory and gravity*, in Exotic Algebraic and Geometric Structures in Theoretical Physics, S. Duplij, ed., Nova Publishers, New York, 2018, pp. 43–76.
- [50] G. A. Goldin, V. M. Shtelen, and S. Duplij, *Conformal symmetry transformations and nonlinear Maxwell equations*, in Mathematical Structures and Applications, T. Diagana and B. Toni, eds., Springer, Berlin, 2018, pp. 211–224.
- [51] S. Duplij, *Arity shape of polyadic algebraic structures*, Math. Inst., arXiv:math.RA/1703.10132, Münster, 2017, 43 p.
- [52] S. Duplij, *Polyadic integer numbers and finite  $(m, n)$ -fields*, p-Adic Numbers, Ultrametric Analysis and Appl. **9** (2017), 257–281 (arXiv:math.RA/1707.00719).
- [53] S. Duplij, *A “ $q$ -deformed” generalization of the Hosszú-Gluskin theorem*, Filomat **30** (2016), 2985–3005.
- [54] S. Duplij, *Formulation of singular theories in a partial Hamiltonian formalism using a new bracket and multi-time dynamics*, Int. J. Geom. Meth. Mod. Phys. **12** (2015), 1550001.
- [55] S. Duplij, Y. Hong, and F. Li,  *$U_q(sl(m+1))$ -module algebra structures on the coordinate algebra of a quantum vector space*, J. Lie Theory **25** (2015), 327–361.
- [56] S. Duplij and W. Werner, *Structure of unital 3-fields*, Math. Inst., arXiv:math.RA/1505.04393, Münster, 2015, 17 p.
- [57] V. Duplij and S. Duplij, *Triander: A new program for visual analysis of nucleotide sequences*, in Factors Exp. Evol. Organisms, V. A. Kunah, ed., Vol. 17, Lohos, Kyiv, 2015, pp. 51–54.
- [58] M. L. Walker and S. Duplij, *Cho-Duan-Ge decomposition of QCD in the constraintless Clairaut-type formalism*, Phys. Rev. **D91** (2015), 064022.
- [59] S. Duplij, *Generalized duality, Hamiltonian formalism and new brackets*, J. Math. Physics, Analysis, Geometry **10** (2014), 189–220.
- [60] S. Duplij, G. A. Goldin, and V. M. Shtelen, *Conformal inversion and Maxwell field invariants in four- and six-dimensional spacetimes*, in XXXII Workshop on the Geometrical Methods in Physics, Białowieża, June 2013, P. Kielanowski, P. Bieliavsky, A. Odesskii, A. Odziejewicz, M. Schlichenmaier, and T. Voronov, eds., Trends in Mathematics, Springer-Birkhäuser, Heidelberg, 2014, pp. 233–242.
- [61] S. Duplij, *Partial Hamiltonian formalism, multi-time dynamics and singular theories*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **1059** (2013), 10–21.
- [62] S. Duplij, **Semisupermanifolds and semigroups**, Createspace Publishing, Charleston, 2013, 220 pp., (Second Printing).
- [63] S. A. Duplij and A. T. Kotvytskiy, *Generalized interaction in multigravity*, Theor. Math. Phys. **177** (2013), 1400–1411.
- [64] S. A. Duplij and A. T. Kotvytskiy, *Multigravity and Pauli-Fierz model*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **1041** (2013), 81–92.

- [65] S. Duplij, E. Di Grezia, G. Esposito, and A. T. Kotvytskiy, *Nonlinear constitutive equations for gravitoelectromagnetism*, Int. J. Geom. Methods Mod. Phys. **10** (2013), 10 pp.
- [66] S. Duplij, Y. Hong, and F. Li, *Analysis of  $U_q(sl(m+1))$ -symmetries on quantum  $n$ -spaces*, Kharkov National University, arXiv:math.QA/1305.6582, Kharkov, 2013, 37 p.
- [67] S. Duplij, *Polyadic systems, representations and quantum groups*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **1017** (2012), 28–59 (Expanded version arXiv:math.RT/1308.4060).
- [68] S. Duplij, *A new Hamiltonian formalism for singular Lagrangian theories*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **969** (2011), 34–39.
- [69] S. Duplij, *On super Cuntz algebras*, in Quantum Electrodynamics and Statistical Physics, 3rd International Conference, NSC KIPT, Kharkiv, 2011, pp. 51–52.
- [70] S. A. Duplij and G. C. Kurinnoj, *Representations, quivers and their supersymmetric generalizations*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **969** (2011), 81–93.
- [71] S. Duplij and S. Sinel'shchikov, *Classification of  $U_q(\mathfrak{sl}_2)$ -module algebra structures on the quantum plane*, J. Math. Physics, Analysis, Geometry **6** (2010), 21–46.
- [72] S. Duplij and S. Sinel'shchikov, *On  $U_q(\mathfrak{sl}_2)$ -actions on the quantum plane*, Acta Polytechnica **50** (2010), 25–29.
- [73] S. Duplij, *Analysis of constraint systems using the Clairaut equation*, in Proceedings of 5th Mathematical Physics Meeting: Summer School in Modern Mathematical Physics, 6 - 17 July 2008, B. Dragovich and Z. Rakic, eds., Institute of Physics, Belgrade, 2009, pp. 217–225.
- [74] S. Duplij, *Generalized duality, Hamiltonian formalism and new brackets*, Kharkov National University, arXiv:math-ph/1002.1565v7 (To appear in J. Math. Phys. Analysis. Geom., 2013), Kharkov, 2009, 24 p.
- [75] S. Duplij and S. Sinel'shchikov, *Quantum enveloping algebras with von Neumann regular Cartan-like generators and the Pierce decomposition*, Commun. Math. Phys. **287** (2009), 769–785.
- [76] S. Duplij and S. Sinel'shchikov, *Quantum enveloping algebras, von Neumann regularity and the Pierce decomposition*, in Proceedings of 5th Mathematical Physics Meeting: Summer School in Modern Mathematical Physics, 6 - 17 July 2008, B. Dragovich and Z. Rakic, eds., Institute of Physics, Belgrade, 2009, pp. 243–255.
- [77] S. Duplij and S. Sinel'shchikov, *Quantum universal enveloping algebras with idempotents and the Pierce decomposition*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **845** (2009), 3–15.
- [78] S. Duplij, G. A. Goldin, and V. M. Shtelen, *Generalizations of nonlinear and supersymmetric classical electrodynamics*, J. Phys. A: Math. Gen. **A41** (2008), 304007.
- [79] A. Y. Berezhnoi and S. A. Duplii, *Dependence of physical properties of nucleotides in aqueous solution on their location in codon and degree of determination*, Biophysical Bull. Kharkov Univ. **1** (2007), 29–47.

- [80] S. A. Duplij and A. T. Kotvytskiy, *Coincidence limit and generalized interaction term structure in multigravity*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **784** (2007), 61–66.
- [81] S. A. Duplij and I. I. Shapoval, *Quantum computations: Fundamentals and algorithms*, Problems Of Atomic Science And Technology (PAST) **3** (2007), 230–235.
- [82] S. A. Duplij and I. I. Shapoval, *Topological methods in quantum computations*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **781** (2007), 3–31.
- [83] S. Duplij, G. A. Goldin, and V. M. Shtelen, *Lagrangian and non-Lagrangian approaches to electrodynamics including supersymmetry*, in XXVI Workshop on the Geometrical Methods in Physics, Bialystok, July 2007, P. Kielanowski, A. Odziejewicz, M. Schlichenmaier, and T. Voronov, eds., Vol. 956 of *AIP Conf. Proc.*, AIP, College Park, 2007, pp. 50–54.
- [84] A. Y. Berezhnoy and S. A. Duplij, *Dependence of physical properties of nucleotides solute in water on their placement in codons and determinative degree*, in Quantum Electrodynamics and Statistical Physics, 2nd International Conference, NSC KIPT, Kharkiv, 2006, p. 146.
- [85] A. Borowiec, W. Dudek, and S. Duplij, *Bi-element representations of ternary groups*, Commun. Algebra **34** (2006), 1651–1670.
- [86] S. A. Duplij, D. V. Soroka, and V. A. Soroka, *A special fermionic generalization of lineal gravity*, J. Zhejiang Univ. Sci. **A7** (2006), 629–632.
- [87] A. Y. Berezhnoy and S. A. Duplij, *Dependence of nucleotide physical properties on their placement in codons and determinative degree*, J. Zhejiang Univ. Sci. **B6** (2005), 948–960.
- [88] D. Duplij and S. Duplij, *DNA sequence representation by trianders and determinative degree of nucleotides*, J. Zhejiang Univ. Sci. **B6** (2005), 743–755.
- [89] S. A. Duplij, V. V. Kalashnikov, and E. A. Maslov, *Quantum information, qubits and quantum algorithms*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **657** (2005), 103–108.
- [90] S. A. Duplij, O. I. Kotulska, and A. S. Sadovnikov, *Constant solutions of quantum Yang-Baxter equation over Grassmann algebra*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **657** (2005), 23–34.
- [91] S. A. Duplij, O. I. Kotulska, and A. S. Sadovnikov, *Quantum Yang-Baxter equation and constant R-matrix over Grassmann algebra*, J. Zhejiang Univ. Sci. **A6** (2005), 1065–1079.
- [92] S. A. Duplij, D. V. Soroka, and V. A. Soroka, *Fermionic generalization of lineal gravity in centrally extended formulation*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **664** (2005), 12–16.
- [93] A. Y. Berezhnoy and S. Duplij, *Dependence of nucleotide physical properties on placement in codons and their determinative degree*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 207–208.

- [94] S. Duplij, *Coderivations, covariant comodule maps and noncommutative geometry*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 173–177.
- [95] S. A. Duplij and V. V. Kalashnikov, *Quantum information, qubits and their generalizations*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 169–171.
- [96] S. A. Duplij and A. T. Kotvytskiy, *Lagrangians in nonlinear multigravity models*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **642** (2004), 3–7.
- [97] S. A. Duplij and N. M. Pelykhaty, *Characteristics of recoil atom implantation profiles*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 44–49.
- [98] S. Duplij and D. Duplij, *DNA walks, trianders and determinative degree*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 250–254.
- [99] S. Duplij and O. Kotulska, *Structure of supermatrix models*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **642** (2004), 45–49.
- [100] S. Duplij and F. Li, *Regular R-matrix and weak Hopf algebras*, in Karazin Natural Science Studios, Kharkov National Univ., Kharkov, 2004, pp. 177–181.
- [101] S. Duplij and A. Sadovnikov, *Structure of quantum linear semigroup with regular quantization parameter*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **642** (2004), 53–58.
- [102] S. Duplij and I. I. Shapoval, *Decays of B meson, supersymmetry and polarization*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **642** (2004), 16–21.
- [103] S. Duplij, W. Siegel, and J. Bagger, eds., **Concise Encyclopedia of Supersymmetry And Noncommutative Structures In Mathematics And Physics**, Kluwer Academic Publishers, Dordrecht-Boston-London, 2004, (Second printing, Springer Science and Business Media, Berlin-New York-Heidelberg, 2005).
- [104] S. Duplij, *On supermatrix idempotent operator semigroups*, Linear Algebra Appl. **360** (2003), 59–81.
- [105] A. Borowiec, W. Dudek, and S. Duplij, *Bi-element representations of ternary groups*, math.GT/0306210, 2003, 18 p.
- [106] D. Duplij and S. Duplij, *Determinative degree and nucleotide sequence analysis by trianders*, Kharkov National Univ., q-bio/0311014, Kharkov, 2003, 24 p.
- [107] S. A. Duplij and O. I. Kotulska, *Quasideterminants, noncommutative determinants and noninvertible supermatrix structures*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **585** (2003), 19–27.
- [108] S. Duplij and W. Marcinek, *Braid semistatistics and doubly regular R-matrix*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **601** (2003), 75–80.
- [109] S. Duplij and W. Marcinek, *Toposes and categories in quantum theory and gravity*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **579** (2003), 17–31.

- [110] S. Duplij and A. Sadovnikov, *On the structure of quantum linear semigroup*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **601** (2003), 32–40.
- [111] A. Borowiec, W. Dudek, and S. Duplij, *On basic concepts of ternary Hopf algebras*, in Int. Conference on Clifford Algebras and their Applications in Mathematical Physics, Tennessee Tech. Inst., Cookeville, 2002, p. 40.
- [112] S. A. Duplij, *Coderivations and codifferential calculi on finite groups*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **559** (2002), 16–24.
- [113] S. A. Duplij and O. I. Kotulska, *Supermatrix structures and generalized inverses*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **548** (2002), 3–14.
- [114] S. Duplij and F. Li, *Hopf quivers*, in International Congress of Mathematicians, Acad. Sinica, Beijing, 2002, p. 214.
- [115] S. Duplij and W. Marcinek, *Regular obstructed categories and topological quantum field theory*, J. Math. Phys. **43** (2002), 3329–3341.
- [116] S. Duplij and A. Sadovnikov, *Regular supermatrix solutions for quantum yang-baxter equation*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **569** (2002), 15–22.
- [117] F. Li and S. Duplij, *Weak Hopf algebras and singular solutions of quantum Yang-Baxter equation*, Commun. Math. Phys. **225** (2002), 191–217.
- [118] A. Borowiec, W. Dudek, and S. Duplij, *Basic concepts of ternary Hopf algebras*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **529** (2001), 21–29 (math.QA/0306208).
- [119] D. Duplij and S. Duplij, *Determinative degree and nucleotide content of DNA strands*, Biophysical Bull. Kharkov Univ. **525** (2001), 86–92.
- [120] S. Duplij, *Semigroups of supermatrices and one-parameter idempotent superoperators*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **510** (2001), 11–23.
- [121] S. Duplij, *Ternary Hopf algebras*, in Symmetry in Nonlinear Mathematical Physics, A. G. Nikitin and V. M. Boyko, eds., Institute of Mathematics, Kiev, 2001, pp. 25–34.
- [122] S. Duplij and A. Frydryszak, *Supersymmetry, nontrivial fermionic shell and nilpotent mechanics*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **510** (2001), 24–30.
- [123] S. Duplij and F. Li, *On regular solutions of quantum Yang-Baxter equation and weak Hopf algebras*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **521** (2001), 15–30.
- [124] S. Duplij and F. Li, *Regular solutions of quantum Yang-Baxter equation from weak Hopf algebras*, Czech. J. Phys. **51** (2001), 1306–1311.
- [125] S. Duplij and W. Marcinek, *Noninvertibility, semisupermanifolds and categories regularization*, in Noncommutative Structures in Mathematics and Physics, S. Duplij and J. Wess, eds., Kluwer, Dordrecht, 2001, pp. 125–140.
- [126] S. Duplij and W. Marcinek, *On regular superalgebras and obstructed categories*, J. Kharkov National Univ., ser. Nuclei, Particles and Fields **521** (2001), 7–12.



- [127] S. Duplij and W. Marcinek, *Regular graded algebras and obstructed categories with duality*, Inst. Theor. Phys., math.QA/0107022, Wrocław, 2001, 13 p.
- [128] S. Duplij and W. Marcinek, *Semisupermanifolds and regularization of categories, modules, algebras and Yang-Baxter equation*, Nucl. Phys. Proc. Suppl. **102** (2001), 293–297 (Int. Conference on Supersymmetry and Quantum Field Theory: D.V. Volkov Memorial Conference, Kharkov, Ukraine, July 2000).
- [129] S. Duplij and W. Marcinek, *Semisupermanifolds and regularization of categories, modules, algebras and Yang-Baxter equation*, in Supersymmetry and Quantum Field Theory, Elsevier Science Publishers, Amsterdam, 2001, pp. 110–115.
- [130] S. Duplij and J. Wess, eds., **Noncommutative Structures in Mathematics and Physics**, Kluwer, Dordrecht, 2001, 493 pp.
- [131] S. Duplij, *On supermatrix idempotent operator semigroups*, Kharkov National Univ., math.FA/0006001, Kharkov, 2000, 11 p.
- [132] G. Bayatyan, ..., S. Duplij, ..., and et.al., **CMS: the TriDAS Project Technical Design Report; v.1, the Trigger Systems**, CERN, Geneva, 2000, 599 pp.
- [133] D. Duplij and S. Duplij, *Purine-pyrimidine symmetry, determinative degree and DNA*, Kharkov National Univ., physics/0008231, Kharkov, 2000, 8 p.
- [134] D. Duplij and S. Duplij, *Symmetry analysis of genetic code and determinative degree*, Biophysical Bull. Kharkov Univ. **488** (2000), 60–70.
- [135] D. Duplij and S. Duplij, *Symmetry analysis of genetic code and determinative degree*, Kharkov National Univ., physics/0006062, Kharkov, 2000, 11 p.
- [136] D. Duplij, S. Duplij, and N. Chashchin, *Symmetric properties of genetic code*, Biopolymers and Cell **16** (2000), 449–454.
- [137] S. Duplij, *On supermatrix operator semigroups*, Quasigroups and Related Systems **7** (2000), 71–98.
- [138] S. Duplij, *On TPT analogs of cocycles and deformations*, in Supersymmetries and Quantum Symmetries, E. Ivanov, S. Krivonos, and A. Pashnev, eds., JINR, Dubna, 2000, pp. 358–363.
- [139] S. Duplij, **Semisupermanifolds and semigroups**, Krok, Kharkov, 2000, 220 pp.
- [140] S. Duplij and M. Chursin, *On structure of smooth semisupermanifolds*, Kharkov State University Journal (Vestnik KSU), ser. Nuclei, Particles and Fields **481** (2000), 22–26.
- [141] S. Duplij and W. Marcinek, *Higher regularity properties of mappings and morphisms*, Univ. Wrocław, IFT UWr 931/00, math-ph/0005033, Wrocław, 2000, 12 p.
- [142] S. Duplij and W. Marcinek, *On higher regularity and monoidal categories*, Kharkov State Univ. J. (Vestnik KSU), ser. Nuclei, Particles and Fields **481** (2000), 27–30.
- [143] S. Duplij and W. Marcinek, *Semisupermanifolds and regularization of categories*, in Supersymmetric Structures in Mathematics and Physics, S. Duplij and V. G. Zima, eds., UkrINTI, Kiev, 2000, pp. 102–115.

- [144] S. Duplij and V. G. Zima, eds., **Supersymmetric Structures in Mathematics and Physics**, UkrINTI, Kiev, 2000, 262 pp.
- [145] S. Duplij, *Noninvertibility and additional symmetries on hyperbolic superplane*, Kharkov State University Journal (Vestnik KSU), ser. Nuclei, Particles and Fields **463** (1999), 3–6.
- [146] S. Duplij, **Semigroup methods in supersymmetric theories of elementary particles**, Habilitation Thesis, Kharkov State University, math-ph/9910045, Kharkov, 1999, 483 pp.
- [147] S. Duplij, *Superconformal-like twisting parity morphisms, deformations and odd cocycles*, Kharkov State University Journal (Vestnik KSU), ser. Nuclei, Particles and Fields **453** (1999), 3–8.
- [148] S. Duplij, *Nonlinear realization of  $N = 1$  superconformal-like transformations*, Univ. Kaiserslautern, KL-TH 98/02, Kaiserslautern, 1998, 15 p.
- [149] S. Duplij, *On semi-supermanifolds*, Pure Math. Appl. **9** (1998), 283–310.
- [150] S. Duplij, *Superconformal-like transformations and nonlinear realizations*, Southwest J. Pure and Appl. Math. **2** (1998), 85–112.
- [151] V. P. Akulov, V. V. Chitov, and S. Duplij,  *$q$ -Differential calculus and deformed light-cone*, in Supersymmetry and Quantum Field Theory, J. Wess and V. P. Akulov, eds., Springer-Verlag, Heidelberg, 1998, pp. 317–320.
- [152] V. P. Akulov and S. Duplij, *Nilpotent marsh and SUSY QM*, City Coll. of City Univ., hep-th/9809089, New York, 1998, 8 p.
- [153] V. P. Akulov and S. Duplij, *Nilpotent marsh and SUSY QM*, in Supersymmetries and Quantum Symmetries, J. Wess and E. A. Ivanov, eds., Springer-Verlag, Heidelberg, 1998, pp. 235–242.
- [154] V. P. Akulov, S. Duplij, and V. V. Chitov, *Differential calculus for  $q$ -deformed twistors*, Theor. Math. Phys. **115** (1998), 513–519 (Teor. Mat. Fiz. **115** (1998) 177–184).
- [155] S. Duplij, *On superconformal-like transformations and their nonlinear realization*, in Supersymmetries and Quantum Symmetries, J. Wess and E. A. Ivanov, eds., Springer-Verlag, Heidelberg, 1998, pp. 243–251.
- [156] S. Duplij, *Continuous representations of semigroup bands by supermatrices*, in Int. L.M. Gluskin Algebraic Conference, Slovyansk, A. M. Samoilenko, ed., Inst. Math., Kiev, 1997, p. 30.
- [157] V. P. Akulov, V. V. Chitov, and S. Duplij, *Differential calculus on  $q$ -deformed light-cone*, Univ. Kaiserslautern, KL-TH-97/1, q-alg/9701026, Kaiserslautern, 1997, 8 p.
- [158] S. Duplij, *Noninvertible  $N=1$  superanalog of complex structure*, J. Math. Phys. **38** (1997), 1035–1040.
- [159] S. Duplij, *Some abstract properties of semigroups appearing in superconformal theories*, Semigroup Forum **54** (1997), 253–260.
- [160] S. Duplij, *Ideal structure of superconformal semigroups*, Theor. Math. Phys. **106** (1996), 355–374.

- [161] S. Duplij, *Noninvertibility and "semi-" analogs of (super) manifolds, fiber bundles and homotopies*, Univ. Kaiserslautern, KL-TH-96/10, q-alg/9609022, Kaiserslautern, 1996, 30 p.
- [162] S. Duplij, *On an alternative supermatrix reduction*, Lett. Math. Phys. **37** (1996), 385–396.
- [163] S. Duplij, *Supermatrix representations of semigroup bands*, Pure Math. Appl. **7** (1996), 235–261 (arXiv:funct-an/9609002).
- [164] S. Duplij, *Ideal structure of superconformal semigroups*, Univ. Kaiserslautern, KL-TH 95/4, CERN-SCAN-9503192, Kaiserslautern, 1995, 50 p.
- [165] S. Duplij, *Towards gauge principle for semigroups*, Acta Phys. Pol. **B23** (1992), 733–743.
- [166] S. Duplij, *On  $N = 4$  super Riemann surfaces and superconformal semigroup*, J. Phys. **A24** (1991), 3167–3179.
- [167] S. Duplij, *On semigroup nature of superconformal symmetry*, J. Math. Phys. **32** (1991), 2959–2965.
- [168] S. Duplij, *Types of  $N = 2$  superconformal transformations*, Theor. Math. Phys. **86** (1991), 138–143 (Teor. Mat. Fiz. **86** (1991) 202–209).
- [169] S. Duplij, *On  $N = 1$  superconformal invariance*, Sov. J. Nucl. Phys. **52** (1990), 742–745 (Yad. Fiz. **52** (1990) 1169–1175).
- [170] S. Duplij, *On  $N = 2$  superconformal transformations*, Probl. Nucl. Phys. Cosm. Rays **33** (1990), 22–38.
- [171] S. Duplij, *Semigroup of  $N = 1, 2$  superconformal transformations and conformal superfields*, Acta Phys. Pol. **B21** (1990), 783–811.
- [172] S. Duplij, *Nilpotent mechanics and supersymmetry*, Probl. Nucl. Phys. Cosm. Rays **30** (1988), 41–49.
- [173] V. P. Akulov and S. Duplij, *Quasiclassical quantization in supersymmetric quantum mechanics*, Ukrainian J. Phys. **33** (1988), 309–311.
- [174] S. Duplij, *Search for superpartners at high energy accelerators. part II.*, Probl. Nucl. Phys. Cosm. Rays **26** (1986), 1–22.
- [175] S. Duplij, *Search for superpartners at high energy accelerators. part I.*, Probl. Nucl. Phys. Cosm. Rays **24** (1985), 82–96.

## Publications by Steven Duplij (1980-1985)

*on radiophysics and nuclear physics, particle physics and quantum chromodynamics*

- [1] S. Duplij, *Calculation of differential and total cross-sections of  $\mathcal{N}$ -interaction*, Russian Phys. J. (Historical Archive) **23** (1980), 827 – 831 (Izvestiya Vyzov. Fizika, **23** N9 (1980) 83–88).
- [2] S. Duplij, *P-invariance breaking in pion photo- and electroproduction on pions*, Probl. Nucl. Phys. Cosm. Rays **13** (1980), 57–65.
- [3] S. A. Duplij and M. P. Rekalo, *On a possibility of gluon spin determination in experiments with linear-polarized photons*, Ukrainian Phys. J. **25** (1980), 1569–1570.
- [4] S. Duplij, *Heavy quark pair formation in hadron-hadron collisions*, Russian Phys. J. (Historical Archive) **24** (1981), 805 – 809 (Izvestiya Vyzov. Fizika, **24** N9 (1981) 30–34).
- [5] S. Duplij, *Leptoproduction of heavy quark pairs on scalar gluons*, Probl. Nucl. Phys. Cosm. Rays **14** (1981), 47–55.
- [6] S. A. Duplij and M. P. Rekalo, *Leptoproduction of heavy quarks with the anomalous chromomagnetic moment*, Acta Phys. Pol. **B12** (1981), 549–561.
- [7] S. Duplij, *Hadroproduction of heavy quark pairs with the anomalous chromomagnetic moment*, Probl. Nucl. Phys. Cosm. Rays **15** (1981), 31–37.
- [8] S. A. Duplij and M. P. Rekalo, *Three-jets processes in  $e^+e^-$  collisions and chromomagnetic moment of quarks*, Ukrainian Phys. J. **26** (1981), 1216–1218 (Ukrainian Fiz. Zh. **26** (1981) 1569–1570).
- [9] S. A. Duplij and M. P. Rekalo, *Complete analysis of polarization in two-particle QCD processes*, Bogolyubov Inst. Theor. Phys., ITP-122E, Kiev, 1982, 12 p. (KEK scan [http://ccdb3fs.kek.jp/cgi-bin/img\\_index?198212078](http://ccdb3fs.kek.jp/cgi-bin/img_index?198212078)).
- [10] S. Duplij, *Gluon bound state production in hadronic collisions*, Probl. Nucl. Phys. Cosm. Rays **16** (1982), 90–92.
- [11] S. A. Duplij and M. P. Rekalo, *Invariant integration in  $2 \rightarrow 3$  QCD processes*, Sov. J. Nucl. Phys. **36** (1982), 1319–1327.
- [12] S. A. Duplij and M. P. Rekalo, *The calculation of  $2 \rightarrow 3$  QCD processes characteristics by invariant integration method*, Inst. Theor. Phys., ITF-82-20R, Kiev, 1982, 23 p. (KEK scan [http://ccdb3fs.kek.jp/cgi-bin/img\\_index?198205058](http://ccdb3fs.kek.jp/cgi-bin/img_index?198205058)).
- [13] O. M. Getmanets, S. A. Duplij, N. M. Pelykhaty, V. M. Puzh, and Z. S. Sagan, *Calculation of recoil atom implantation into silicon substrate*, Probl. Nucl. Phys. Cosm. Rays **19** (1983), 80–84.
- [14] S. Duplij, *Bound state production in QCD*, in Creative Development of Young Physicists, Kharkov State Univ., Kharkov, 1982, p. 10.
- [15] N. I. Gavrilova and S. A. Duplij, *The complex representation for nonstationary random processes*, Radiophysics (Deponent VINITI) **6130-83** (1983), 18 p.
- [16] O. M. Getmanets, S. A. Duplij, S. V. Landar, N. M. Pelykhaty, V. M. Puzh, and Z. S. Sagan, *Analysis of surface film atoms implantation into silicon substrate*, in Diagnostic of

Surface by Ion Beams, State Univ., Zaporoshie, 1983, p. 27.

[17] S. Duplij, *Photoproduction on polarized quarks in QCD*, Probl. Nucl. Phys. Cosm. Rays **20** (1984), 23–29.

[18] O. M. Getmanetz, S. A. Duplij, I. I. Zalyubovsky, N. M. Pelykhaty, and M. A. Rukavitsyn, *Analytic method applications for backscattering spectra analysis*, Probl. Nucl. Phys. Cosm. Rays **22** (1984), 71–80.

[19] S. A. Duplij, S. V. Landar, and N. M. Pelykhaty, *On applicability of the backscattering method for determination of secondary ion depth profiles in thin layers*, in Interaction of Atomic Particles With Solid State, Belarus Univ., Minsk, 1984, p. 62.

[20] S. Duplij, *Gluonium production in QCD processes*, Probl. Nucl. Phys. Cosm. Rays **23** (1985), 37–42.

[21] S. A. Duplij, N. M. Pelykhaty, and Z. S. Sagan, *On the analytical connection between energy and depth scales in ion backscattering*, Russian Phys. J. (Izvestiya Vyzov. Fizika) **28** (1985), 112–114.

[22] N. I. Gavrilova, S. A. Duplij, and N. A. Sivozalizov, *On the calculation of noise spectral characteristics for nonlinear functional units of radiosystems*, Deponent VINITI (Moscow) **9091-B88** (1988), 18 p.

[23] O. M. Getmanetz, S. A. Duplij, and N. M. Pelykhaty, *Towards theory of recoil atom implantation into semiconductors*, in Ion Beam Applications, Kharkov State Univ., Kharkov, 1988, p. 57.

[24] S. A. Duplij, N. M. Pelykhaty, and S. A. Steshenko, *Recoil implantation of nickel surface layer atoms into silicon*, Russian Phys. J. (Historical Archive) **32** (1989), 533 – 536 (Izvestiya Vyzov. Fizika, **32** N7 (1989) 36–40).

[25] O. M. Getmanetz, S. A. Duplij, I. I. Zalyubovsky, and N. M. Pelykhaty, *Formation of recoil atom implantation profiles in thin surface layers*, Surface **2** (1989), 60–65.

[26] S. A. Duplij, N. M. Pelykhaty, and S. A. Steshenko, *Investigation of stoichiometry of complex crystals and films*, in Microanalysis on Ion Beams, State Univ., Sumy, 1990, p. 30.

[27] S. A. Duplij, N. M. Pelykhaty, and S. A. Steshenko, *Study of diffusion recoil implantation of tantalum into corundum by backscattering method*, in Microanalysis on Ion Beams, State Univ., Sumy, 1990, p. 31.

[28] S. A. Duplij, N. M. Pelykhaty, and S. A. Steshenko, *On recoil implantation of thin nickel film atoms into silicon*, in Microanalysis on Ion Beams, State Univ., Sumy, 1990, p. 72.

[29] S. A. Duplij, N. M. Pelykhaty, and S. A. Steshenko, *To the theory of recoil atom implantation*, Surface **3** (1992), 12–17.

[30] S. A. Duplij and Y. G. Mashkarov, *Helicity formalism in description of many-nucleon transfer reactions*, in Nuclear Spectroscopy and Structure of Nuclei, JINR, Dubna, 1993, p. 276.

[31] S. A. Duplij and Y. G. Mashkarov, *On helicity description of polarization in cluster transfer reactions*, in Nuclear Spectroscopy and Structure of Nuclei, JINR, Dubna, 1993, p. 309.