

LEBENS LAUF

PERSÖNLICHEN ANGABEN

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AUSGEWÄHLTER BERUFLICHER WERDEGANG

2019 bis jetzt **Universität Münster (CIT)**
Wissenschaftlicher Mitarbeiter am IT-Zentrum: Quantenberechnung und Quanteninformation

2016 **Hochschule Bochum**
Lehrbeauftragte der Mathematik im Sommersemester 2016
Aufgabe: Vorlesung und Übung "Mathematik für Informatiker 2 und Matlab-Praktikum

2014 bis 2016 **Westfälische Wilhelms-Universität Münster**
Wissenschaftlicher Mitarbeiter am Fachbereich der Mathematik
Forschung: Mathematik and theoretische Physik

1983 bis 2014 **Kharkov National University, Charkiw, Ukraine**
Führender hochrangiger wissenschaftlicher Mitarbeiter beim Kernphysiklabor
Forschung: Kernphysik, mathematische Physik, DNA Theorie

2011 bis 2012 **Rutgers University, USA**
Fulbright-Stipendiat in der Mathematik
Lehrer der Mathematik
Forschung: mathematische Physik

2000 bis heute **CERN**
CMS-Kollaboration

1992 bis 1993 **Kharkov State University, Charkiw, Ukraine**
Wissenschaftlicher Mitarbeiter beim Astronomischen Observatorium

1978 bis 1983 **Kharkov State University, Charkiw, Ukraine**
Halbzeit-Forscher beim Radiophysiklabor
Forschung: Noise Theorie

AUSBILDUNG

- 2002 **Erhalten des akademischen Status des hochrangigen wissenschaftlichen Mitarbeiters von der Höchsten Attestationskommission**, Kiew, Ukraine
- 1999 Bogolyubov Institute of Theoretical Physics, Kiew, Ukraine
Abschluss: **Habilitation**, Doktor der physikalisch-mathematischen Wissenschaften
- 1983 **Promotionsschrift: "Theoretical Investigation of Hard Processes in QCD"**
1978 bis 1982 Kharkov State University, Charkiw, Ukraine
Postgraduales Studium der Theoretischen Physik
Abschluss: **Doktorgrad**, Kandidat der physikalisch-mathematischen Wissenschaften
- 1974 bis 1978 Kharkov State University, Charkiw, Ukraine
Studium der Theoretischen Kernphysik
Abschluss: **Diplomgrad Univ.**, Physikingenieur, theoretische Kernphysik (sehr gut)

Vollständige Liste von wissenschaftlichen Publikationen auf Anfrage verfügbar.
Insgesamt: **193** Veröffentlichungen, darunter 9 Bücher und 184 Artikel.
Darüber hinaus: **130** Einträge in der *Concise Encyclopedia of Supersymmetry*.

SUPERVISION

5 Studenten bekamen sehr gute M.Sc.-Abschlüsse in der Theoretischen Physik
4 PhD-Studenten, 1 PhD-Dissertation verteidigt

QUALIFIKATIONEN UND KENNTNISSE

- EDV-Kenntnisse Programmierung: Perl, Mathematica, Maple, LaTeX, BibTeX, HTML
Betriebssysteme: MS-DOS, Windows, Unix, Linux
Software: Scientific WorkPlace, dBase, Adobe Produkte, Microsoft Office
- Sprachkenntnisse Englisch (verhandlungssicher), Deutsch (konversationssicher, B1),
Russisch (Muttersprache), Ukrainisch (Muttersprache),
Italienisch (Grundkenntnisse)

MITGLIEDSCHAFTEN IN BERUFSVEREINIGUNGEN

AMERICAN PHYSICAL SOCIETY (College Park, MD)
AMERICAN MATHEMATICAL SOCIETY (Providence, RJ)
INTERNATIONAL ASSOCIATION OF MATHEMATICAL PHYSICS (Cambridge, MA)
ENGLISH INTERNATIONAL ASSOCIATION (Lund, Schweden)
RUSSIAN UNION OF WRITERS (Moskau, Russland)
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (Washington, DC)
EUROPEAN PHYSICAL SOCIETY (Genf, Schweiz)
INTERNATIONAL MATHEMATICAL UNION (IAS, Princeton)

GELISTET

UNIVERSITÄT MÜNSTER HIGHLY CITED RESEARCHERS
WORLD DIRECTORY OF MATHEMATICIANS
MARQUES WHO IS WHO IN AMERICA
ENCYCLOPEDIA OF MODERN UKRAINE
ACADEMIC GENEALOGY OF THEORETICAL PHYSICISTS
MATHEMATICS GENEALOGY PROJECT

WISSENSCHAFTLICHE RESULTATE UND INNOVATIVE IDEEN

- A new direction in **supersymmetric models** of elementary particles, based on the inclusion of semigroups is proposed. The concept of *semi-supermanifold* is introduced.
- **Quantum groups**: a generalization of the Hopf algebra is introduced by relaxing the requirement for inverses of the generators of the Cartan subalgebra, which leads to a *regular quasi-R-matrix* structure. The actions of universal enveloping quantum algebras on quantum planes of arbitrary dimension are found.
- **Singular theories** with degenerate Lagrangians are formulated *without* involving constraints. A new partial Hamiltonian formalism is constructed. A new antisymmetric bracket (an analogue of the Poisson bracket) describing the time evolution of singular systems is built.
- **Nonlinear gauge theories**: a generalized approach to nonlinear classical electrodynamics and supersymmetric electrodynamics is suggested, which takes into account all possible types of media and nonlocal effects, and is described in both Lagrangian and *non-Lagrangian* theories.
- **Gravity**: nonlinear equations for gravito-electromagnetism and an exact form of the Maxwell gravitational field equations are obtained. A general approach to describing the interaction of multi-gravity models in space-times of arbitrary dimension is formulated. The gauge gravity vacuum is investigated in the *constraintless Clairaut-type formalism*.
- **DNA theory**: a new characteristic of nucleotides, the *determination degree*, which is proportional to the dipole moment, is unveiled. The concept of a *triander* is set up, which leads to a new method of visual analysis and identification of DNA.
- **Polyadic structures**: *polyadization*, i.e. exchanging binary operations with higher arity ones, is proposed as a general new approach to the algebraic structures used in physics. A polyadic analog of homomorphism, or *heteromorphism*, a mapping between algebraic structures of different arities, is introduced. The *arity invariance principle*, a manifest expression of algebraic structure in terms of operations that does not depend on their arities, is claimed. In the same way, the following new structures are defined: *higher braid groups*, *higher Coxeter groups*, unusual *polyadic fields and rings* having addition and multiplication of different arities, *polyadic integer numbers*, *polyadic convolution products* having multiplication and comultiplication of different arities and their corresponding *polyadic Hopf algebra* and *n-ary R-matrix*, *polyadic multistar adjoints* and *polyadic operator C^* -algebras*. The *polyadic analog of Fermat's Last Theorem* is formulated. A new class of division algebras, the *hyperpolyadic algebras*, which correspond to the binary division algebras \mathbb{R} , \mathbb{C} , \mathbb{H} , \mathbb{O} (reals, complex, quaternions, octonions) are defined. A *polyadic analog of the Cayley–Dickson construction* is proposed, and a novel iterative process gives “*half-quaternions*” and “*half-octonions*”. The sigma matrices and the Pauli group are generalized to higher arities, and a toy model of one-dimensional supersymmetric quantum mechanics, as a first example of *polyadic supersymmetry*, is constructed using them.
- **Quantum computing**: a new conception of quantum computing which incorporates an additional kind of uncertainty, vagueness/fuzziness, by introducing a new “*obscure*” class of *qudits/qubits*, is announced. A superqubit theory in super-Hilbert space is reconsidered, and a new kind of *superqubit carrying odd parity* is introduced. A new kind of quantum gates, namely *higher braiding gates*, is suggested, which lead to a special type of multiqubit entanglement that can speed up key distribution and accelerate various algorithms. A novel visualization of quantum walks in terms of newly defined objects, *polyanders*, is also proposed.

INTERESSEN

- Redakteur und Gutachter bei Wissenschaftszeitschriften
- Schreiben von Gedichten und Kurzgeschichten (14 Bücher; über 200 Veröffentlichungen)
- Gitarre spielen und Lieder komponieren (2 CDs; 1 MC, GEMA)

Münster, 10. Januar 2024

