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| 1. Record Nr.           | UNISA996466722203316  |
| Titolo                  | Group Theoretical Methods in Physics [[electronic resource] ] : Proceedings of the XVIII International Colloquium Held at Moscow, USSR, 4-9 June 1990 // edited by Victor V. Dodonov, Vladimir I. Man'ko  |
| Pubbl/distr/stampa      | Berlin, Heidelberg : , : Springer Berlin Heidelberg : , : Imprint : Springer, , 1991  |
| ISBN                    | 3-540-47363-7   |
| Edizione                | [1st ed. 1991.]   |
| Descrizione fisica      | 1 online resource (XVII, 601 p.)  |
| Collana                 | Lecture Notes in Physics, , 0075-8450 ; ; 382   |
| Disciplina              | 530.1/522   |
| Soggetti                | Quantum physics<br>Quantum computers<br>Spintronics<br>Quantum Physics<br>Quantum Information Technology, Spintronics   |
| Lingua di pubblicazione | Inglese   |
| Formato                 | Materiale a stampa  |
| Livello bibliografico   | Monografia  |
| Note generali           | Bibliographic Level Mode of Issuance: Monograph   |
| Nota di contenuto       | Introductory talk -- Creating "clouds" -- Opening remarks -- Laudatio for Professor Francesco Iachello -- Symmetry -- Dynamical and fundamental symmetries in particles and nuclei -- Spectrum generating groups — idea and application -- The role of dynamic symmetries and supersymmetries in nuclear physics -- SO(3,2) for oscillator and hydrogenlike systems -- Conformal groups in the Kepler problem -- Potential group in optics: The maxwell fish-eye system -- Transition to chaos in hadronic systems -- The dynamical group of Riemann ellipsoids -- An algebraic model of cluster states in odd-mass nuclei -- Compact to noncompact transition and nuclear collective levels -- $\overline{SL(3,R)} \times T^6$ as a nuclear collective motion group -- Exceptional groups and the interacting boson approximation -- An overview of quantum groups -- Integrable theories, Yang-Baxter algebras and quantum groups: An overview -- Finite - dimensional irreducible representations of the quantum superalgebra $Uq[gl(n/l)]$ -- Projection operator method and Q-analog of angular momentum theory -- Quantum algebras and symmetries of dynamical systems -- |

Coulomb gas realization of simple quantum groups -- String theory, quantum gravity and quantum groups --  $q$ -Oscillator realizations of the quantum superalgebras  $sl_q(m, n)$  and  $osp_q(m, 2n)$  -- Relativistic oscillator =  $q$ -oscillator -- Some aspects of the angular momentum coefficients in  $SU_q(2)$  -- Contractions and analytic continuations of the irreducible representations of the quantum algebra  $su_q(2)$  -- Universal  $R$ -matrix for quantum supergroups -- Recent progress in non-commutative geometry -- Algebraic gauge theory and noncommutative geometry -- Classification of the symmetries of ordinary differential equations -- Conditional symmetries and conditional integrability for nonlinear systems -- Cohomology and symmetry of differential equations -- Derivations of semi-basic forms and symmetries of second-order equations -- Hamilton-Jacobi equations in  $SU(2, 2)$  homogeneous spaces -- Linearization of PDEs -- Perturbed nonlinear equations: Application to the Korteweg-DeVries equation considered as a perturbed Euler equation -- Algebraic version of the soliton perturbation theory -- Extended chiral conformal models with a quantum group symmetry -- Conformal reduction of WZNW theories and  $W$ -algebras -- The resurrection of a forgotten symmetry: De Broglie's symmetry -- Relativistic invariance of a many body system with a Dirac oscillator interaction -- Derivation of the geometrical Berry phase -- Gauge translations and the Berry phase -- Geometric quantization: Regular representations and modular algebras -- Geometro-stochastic quantization and quantum geometry --  $SO(4, 1)$ -Coherent states and the geometro-stochastic quantization of a gauge theory for extended objects -- Covariant quantum mechanics and the symmetries of its radiation fields -- Double stratonovich - Hubbard trick and novel path integral for a system of interacting fermions -- Nonrelativistic limit of superfield theories -- Remarks on the supersymmetric WKB quantization formula -- Particle in a self-dual monopole field: example of supersymmetric quantum mechanics -- Supersymmetry and electron angular momentum -- Parasupersymmetries and Lie superalgebras -- Quantum chaos: Spectra and states -- Quantum ergodicity and eigenvalue problems for plane polygons -- "Classical" in terms of general statistical models -- Temporal decoherence in Lorentz-squeezed hadrons -- Physical significance of correlated and squeezed states -- On the symmetry and dynamics of squeezed and correlated states -- Correlated States of Quantum Chain -- Interaction of weak coherent light with a system of two - level atoms in a lossless cavity -- Time dependent quantum tunnelling -- Non-spurious harmonic oscillator states with arbitrary permutational symmetry -- Symmetry analysis of the qualitative intramolecular phenomena -- Algebras of the  $SU(n)$  vector invariants and some of their applications -- Product formulas for  $Q$ -representatives -- Tensor products for affine Kac-Moody algebras -- Atypical modules of the Lie superalgebra  $gl(m/n)$  -- Vector coherent state theory of the non-compact orthosymplectic superalgebras -- The composition factors of Kac modules of  $sl(M/N)$  -- Clifford algebras, spinors and finite geometries -- Reducibility of Euclidean motion groups -- Software packages: Space groups and their representations -- Software packages: Transformation coefficients for space groups -- Icosahedral dissectable tilings from the root lattice  $D_6$  -- Groups with  $G$ -number parameters -- Regge Calculus with torsion -- Quasiperiodicity: Local and global aspects -- Derivative Moutfang transformations -- On the explicit form of consistent anomalies -- Berry phases and Wyckoff positions for energy bands in solids -- Crystallography of quasicrystals: The problem of restoration of broken symmetry.

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## Sommario/riassunto

This volume contains review talks and a small selection of the research papers presented at the world's most distinguished conference on group theoretical methods in physics. The papers are devoted to such topics as spectrum generating groups, quantum groups, coherent states, and geometric aspects of group representations. The methods apply to nuclear physics, quantum mechanics, ordinary and supersymmetric linear and non-linear differential equations, geometry, and non-commutative geometry. The book addresses theoretical physicists, especially those in research.

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