

## Contents

List of participants	3
Foreword	7
Contents	9

### I. Quantum Field Theoretic Models and Geometry

Aspects of canonical gravity and supergravity H. Nicolai and H.-J. Matschull	15
Topological phases of quantum theories. Chern–Simons theory M. Asorey	63
The Mathai–Quillen formalism and topological field theory M. Blau	95
The algebraic structure of cohomological field theory D. Birmingham and M. Rakowski	129
A discrete approach to topological quantum field theories B. Durhuus	155
State sum invariants of three-manifolds: A combinatorial approach to topological quantum field theories M. Karowski and R. Schrader	181
Invariants of three-manifolds from finite group cohomology D. Altschuler and A. Coste	191
Extended conformal symmetries E. Bergshoeff	205
Semi-infinite cohomology in conformal field theory and 2D gravity P. Bouwknegt, J. McCarthy and K. Pilch	225
Lattice Wess–Zumino–Witten model and quantum groups F. Falceto and K. Gawędzki	251
Aspects of affine Toda field theory E. Corrigan	281
W geometry from chiral embeddings J.-L. Gervais	293

## II. Noncommutative Geometry, Quantum Groups with Applications to Quantum Physics

Non-commutative geometry: a physicist's brief survey	307
R. Coquereaux	
Graded non-commutative geometries	325
R. Kerner	
Superselection sectors in low dimensional quantum field theory	337
K. Fredenhagen	
Deformations of the canonical commutation relations	349
D. Fairlie	
A short introduction to quantum symmetry	361
G. Mack and V. Schomerus	
Three lectures on quantum groups: representations, duality, real forms	367
V.K. Dobrev	
Topological representations of quantum groups and conformal field theory	397
G. Felder	
Search for minimal quantum group $SU_q(2)$ gauge field theory	409
I.Ya. Aref'eva and G.E. Arutyunov	
Quantum Poincaré algebra with standard real structure	425
J. Lukierski, A. Nowicki and H. Ruegg	
Quantum and super-quantum group related to the Alexander–Conway polynomial	437
S. Majid and M.J. Rodríguez-Plaza	
On Drinfeld's realization of quantum affine algebras	445
S.M. Khoroshkin and V.N. Tolstoy	
On integrable quantum group invariant antiferromagnets	453
R. Cuerno, G. Sierra and C. Gómez	

## III. Functional Integration, Geometry and Stochastic Analysis

Dirac operators in Boson–Fermion Fock spaces and supersymmetric quantum field theory	465
A. Arai	
Anticommuting variables, fermionic path integrals and supersymmetry	491
A. Rogers	
Fermionic and supersymmetric stochastic processes	507
J. Kupsch	

Integration by parts formulas and rotationally invariant Sobolev calculus on free loop spaces	
R. Leandre	517
A stochastic approach to Wilson loops	
C. Becker	529
Supersymmetric quantum mechanics and the index theorem	
R.H. Rietdijk	545
Geodesics on loop spaces	
U. Schäper	553
Symmetries and motions in manifolds	
J.W. van Holten and R.H. Rietdijk	559
Author index to volume 11	575