

Communications in  
**Mathematical  
Physics**

Volume 148 1992

Chief Editor A. Jaffe, Cambridge, MA

Editorial Board M. Aizenman, Princeton, NJ  
H. Araki, Kyoto  
A. Connes, Bures-sur-Yvette  
J.-P. Eckmann, Genève  
M. E. Fisher, College Park, MD  
J. Fröhlich, Zürich  
K. Gawedzki, Bures-sur-Yvette  
M. Herman, Palaiseau  
J. L. Lebowitz, New Brunswick, NJ  
N. Yu. Reshetikhin, Berkeley, CA  
B. Simon, Pasadena, CA  
Ya. G. Sinai, Moscow  
T. Spencer, Princeton, NJ  
S.-T. Yau, Cambridge, MA

Advisory Board M. F. Atiyah, Oxford  
F. Hirzebruch, Bonn  
G. 't Hooft, Utrecht  
R. Schrieffer, Santa Barbara, CA  
I. Singer, Cambridge, MA  
C. N. Yang, Stony Brook, NY



Springer International

### **Copyright**

Submission of a manuscript implies: that the work described has not been published before (except in the form of an abstract or as part of a published lecture, review, or thesis); that it is not under consideration for publication elsewhere; that its publication has been approved by all coauthors, if any, as well as by the responsible authorities at the institute where the work has been carried out; that, if and when the manuscript is accepted for publication, the authors agree to automatic transfer of the copyright to the publisher; and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.

All articles published in this journal are protected by copyright, which covers the exclusive rights to reproduce and distribute the article (e. g., as offprints), as well as all translation rights. No material published in this journal may be reproduced photographically or stored on microfilm, in electronic data bases, video disks, etc., without first obtaining written permission from the publisher.

The use of general descriptive names, trade names, trademarks, etc., in this publication, even if not specifically identified, does not imply that these names are not protected by the relevant laws and regulations.

While the advice and information in this journal is believed to be true and accurate at the date of its going to press, neither the authors, the editors, nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

#### *Special regulations for photocopies in the USA:*

Photocopies may be made for personal or in-house use beyond the limitations stipulated under Section 107 or 108 of U.S. Copyright Law, provided a fee is paid. This fee is US \$ 0.20 per copy, plus a basic fee of US \$ 2.00 per article. All fees should be paid to the Copyright Clearance Center, Inc., 21 Congress Street, Salem, MA 01970, USA, stating the ISSN 0010-3616, the volume, and the first and last page numbers of each article copied. The copyright owner's consent does not include copying for general distribution, promotion, new works, or resale. In these cases, specific written permission must first be obtained from the publisher.

Springer-Verlag Berlin Heidelberg New York Tokyo Hong Kong Barcelona Budapest  
Printers: Brühlsche Universitätsdruckerei, Giessen  
Printed in Germany — © Springer-Verlag Berlin Heidelberg 1992  
Springer-Verlag GmbH & Co KG, 1000 Berlin 33, Federal Republic of Germany

# Contents

- Ali, A., Kumar, A., Maharana, J., Sengupta, G.: Algebraic Structure of Topological Superconformal Field Theory on Riemann Surfaces 117
- Anagnostopoulos, K. N., Bowick, M. J., Schwarz, A.: The Solution Space of the Unitary Matrix Model String Equation and the Sato Grassmannian 469
- Aurell, E. → She, Z.-S. 623
- Berglund, P., Hübsch, T., Parkes, L.: The Complete Matter Sector in a Three-Generation Compactification 57
- Bismut, J.-M.: Complex Equivariant Intersection, Excess Normal Bundles and Bott-Chern Currents 1
- Bismut, J.-M.: On Certain Infinite Dimensional Aspects of Arakelov Intersection Theory 217
- Bowick, M. J. → Anagnostopoulos, K. N. 469
- Bunke, U., Hirschmann, T.: The Index of the Scattering Operator on the Positive Spectral Subspace 487
- Burdík, Č., Havlíček, M., Vančura, A.: Irreducible Highest Weight Representations of Quantum Groups  $U_q(\mathfrak{gl}(n, \mathbb{C}))$  417
- Camporesi, R.: The Spinor Heat Kernel in Maximally Symmetric Spaces 283
- Dereziński, J.: Large Time Behavior of Classical  $N$ -body Systems 503
- Dolan, B. P., Nash, Ch.: Zeta Function Continuation and the Casimir Energy on Odd and Even Dimensional Spheres 139
- Eschenburg, J.-H., Galloway, G. J.: Lines in Space-Times 209
- Frisch, U. → She, Z.-S. 623
- Fröhlich, J., Studer, U. M.:  $U(1) \times SU(2)$ -Gauge Invariance of Non-Relativistic Quantum Mechanics, and Generalized Hall Effects 553
- Fukuma, M., Kawai, H., Nakayama, R.: Explicit Solution for  $p$ - $q$  Duality in Two-Dimensional Quantum Gravity 101
- Galloway, G. J. → Eschenburg, J.-H. 209
- Georgiev, V., Schirmer, P. P.: The Asymptotic Behavior of Yang-Mills Fields in the Large 425
- Gibbons, G. W., Hawking, S. W.: Selection Rules for Topology Change 345
- Giulini, D.: On the Selection Rules for Spin-Lorentz Cobordisms 353
- Goldberg, J. N., Lewandowski, J., Stornaiolo, C.: Degeneracy in Loop Variables 377
- Golenishcheva-Kutuzova, M., Lebedev, D.: Vertex Operator Representation of Some Quantum Tori Lie Algebras 403
- Guido, D., Longo, R.: Relativistic Invariance and Charge Conjugation in Quantum Fields Theory 521
- Havlíček, M. → Burdík, Č. 417
- Hawking, S. W. → Gibbons, G. W. 345
- Haydn, N. T. A., Ruelle, D.: Equivalence of Gibbs and Equilibrium States for Homeomorphisms Satisfying Expansiveness and Specification 155
- Hirschmann, T. → Bunke, U. 487
- Hübsch, T. → Berglund, P. 57
- Inozemtsev, V. I.: The Extended Bethe Ansatz for Infinite  $S = 1/2$  Quantum Spin Chains with Non-Nearest-Neighbor Interaction 359
- Kawai, H. → Fukuma, M. 101
- Kawamoto, N., Watabiki, Y.: Topological Particle Field Theory, General Coordinate Invariance and Generalized Chern-Simons Actions 169
- Kawashima, S., Shibata, Y.: Global Existence and Exponential Stability of Small Solutions to Nonlinear Viscoelasticity 189

IV

- Keller, G., Kopper, C.: Perturbative Renormalization of Composite Operators via Flow Equations I 445  
 Kopper, C. → Keller, G. 445  
 Kumar, A. → Ali, A. 117
- Lebedev, D. → Golenishcheva-Kutuzova, M. 403  
 Lewandowski, J. → Goldberg, J. N. 377  
 Longo, R. → Guido, D. 521
- Maharana, J. → Ali, A. 117  
 McArthur, I. N.: On the Integrability of the Super-KdV Equation 177
- Nakayama, R. → Fukuma, M. 101  
 Nash, Ch. → Dolan, B. P. 139  
 Niedermaier, M.: Irrational Free Field Resolutions for  $W(sl(n))$  and Extended Sugawara Construction 249
- Parkes, L. → Berglund, P. 57  
 Ruelle, D. → Haydn, N. T. A. 155
- Schirmer, P. P. → Georgiev, V. 425  
 Schwarz, A. → Anagnostopoulos, K. N. 469  
 Sengupta, G. → Ali, A. 117  
 She, Z.-S., Aurell, E., Frisch, U.: The Inviscid Burgers Equation with Initial Data of Brownian Type 623  
 Shibata, Y. → Kawashima, S. 189  
 Sinai, Ya. G.: Statistics of Shocks in Solutions of Inviscid Burgers Equation 601  
 Stornaiolo, C. → Goldberg, J. N. 377  
 Studer, U. M. → Fröhlich, J. 553
- Vančura, A. → Burdík, Ā. 417
- Watabiki, Y. → Kawamoto, N. 169  
 Weinstein, A., Xu, P.: Classical Solutions of the Quantum Yang-Baxter Equation 309
- Xu, P. → Weinstein, A. 309

Indexed in *Current Contents*

Evaluated and abstracted for *PHYS* on *STN*

# Communications in Mathematical Physics

Volume 148 Number 3 1992

- |  |   |
|--|---|
| V. Georgiev, P. P. Schirmer                        | The Asymptotic Behavior of Yang–Mills Fields in the Large 425   |
| G. Keller, C. Kopper                               | Perturbative Renormalization of Composite Operators via Flow Equations I 445                                  |
| K. N. Anagnostopoulos,<br>M. J. Bowick, A. Schwarz | The Solution Space of the Unitary Matrix Model String Equation and the Sato Grassmannian 469                  |
| U. Bunke, T. Hirschmann                            | The Index of the Scattering Operator on the Positive Spectral Subspace 487                                    |
| J. Dereziński                                      | Large Time Behavior of Classical $N$ -body Systems 503  |
| D. Guido, R. Longo                                 | Relativistic Invariance and Charge Conjugation in Quantum Field Theory 521                                    |
| J. Fröhlich, U. M. Studer                          | $U(1) \times SU(2)$ -Gauge Invariance of Non-Relativistic Quantum Mechanics, and Generalized Hall Effects 553 |
| Ya. G. Sinai                                       | Statistics of Shocks in Solutions of Inviscid Burgers Equation 601  |
| Z.-S. She, E. Aurell, U. Frisch                    | The Inviscid Burgers Equation with Initial Data of Brownian Type 623  |
|  | Contents of Vol. 148  |

Indexed in *Current Contents*  
Evaluated and abstracted for *PHYS* on *STN*



Springer International

Acta Informatica

Archive for  
Mathematical Logic

Communications in  
Mathematical Physics

Economic Theory  
Inventiones mathematicae

Journal of  
Mathematical Biology  
Mathematische Annalen  
Mathematische Zeitschrift  
Numerische Mathematik

Probability Theory  
and Related Fields

Theoretica Chimica Acta  
Acta Informatica

Archive for  
Mathematical Logic

Communications in  
Mathematical Physics  
Economic Theory  
Inventiones mathematicae

Journal of  
Mathematical Biology  
Mathematische Annalen  
Mathematische Zeitschrift

## **T<sub>E</sub>X users do it with Springer macros**

If you are used to preparing your manuscripts with plain-T<sub>E</sub>X, you may be interested to hear that we have created a macro package for the layout of the journals listed here.

Articles may now be submitted as plain-T<sub>E</sub>X files using our macros. They will be phototypeset directly from your T<sub>E</sub>X-file, thus cutting down proofreading and publishing times.

The macros plus AMS fonts are available on 3.5" DOS diskettes and are free of charge.

Please order your copy by writing to



Springer-Verlag  
Journal Production  
Post Box 10 52 80  
W-6900 Heidelberg, FRG

e-mail: Springer @dhdspr16.bitnet

An e-mail to svserv@dhdspr16 containing *help* will provide you with info on our **mailserver**.

**Please do not forget to indicate  
the journal for which you  
are intending to submit your  
manuscript.**

L<sup>A</sup>T<sub>E</sub>X stylefiles are in preparation.