

Communications in
**Mathematical
Physics**

Volume 66 Number 3 1979

J. Dell, L. Smolin Graded Manifold Theory as the Geometry of
Supersymmetry 197

J. Fröhlich The Charged Sectors of Quantum
Electrodynamics in a Framework of Local
Observables 223

G. W. Gibbons, C. N. Pope The Positive Action Conjecture and
Asymptotically Euclidean Metrics in Quantum
Gravity 267

Gibbons, S. W. Hawking Classification of Gravitational Instanton
Symmetries 291

Indexed in Current Contents



Springer-Verlag
Berlin Heidelberg New York

Commun. Math. Phys.
ISSN 0010-3616 CMPHAY 66 (3) 197-310 (1979)

22. V. 1979

Communications in Mathematical Physics

Copyright

It is a fundamental condition that submitted manuscripts have not been published and will not be simultaneously submitted or published elsewhere. By submitting a manuscript, the authors agree that the copyright for their article is transferred to the publisher if and when the article is accepted for publication. The copyright covers the exclusive rights to reproduce and distribute the article, including reprints, photographic reproductions, microform or any other reproductions of similar nature, and translations.

Photographic reproduction, microform, or any other reproduction of text, figures, or tables from this journal is prohibited without permission obtained from the publisher.

Special Regulations for the USA. The Article Fee Code on the first page of an article in this journal indicates the copyright owner's consent that in the USA copies may be made for personal or internal use, provided the stated fee for copying beyond that permitted by Section 107 or 108 of the United States Copyright Law is paid through the Copyright Clearance Center, Inc.

If a code does not appear, copies of the article may be made without charge, provided permission is obtained from the publisher.

The copyright owner's consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific written permission must be obtained from the publisher for such copying.

Authors should mark manuscripts according to the "Instructions to Authors" and may send manuscripts to:

Prof. H. Araki, Research Institute for Mathematical Sciences, Kyoto University, Kyoto, 606, Japan

Prof. E. Brézin, Service de Physique Théorique, CEN Saclay, B. P. 2, F-91190 Gif-sur-Yvette, France

Prof. R. Geroch, E. Fermi Institute, University of Chicago, 933 East 56 Street, Chicago, IL 60637, USA

Prof. J. Ginibre, Laboratoire de Physique Théorique et Hautes Énergies, Université de Paris IX, Batiment 211, F-91405 Orsay, France

Prof. J. Glimm, The Rockefeller University, 1230 York Avenue, New York, NY 10021, USA

Prof. R. Haag, II. Institut für Theoretische Physik, Luruper Chaussee 149, D-2000 Hamburg 50, Federal Republic of Germany

Prof. A. Jaffe, Lyman Laboratory of Physics, Harvard University, Cambridge, MA 02138, USA

Prof. J. L. Lebowitz, Department of Mathematics, Rutgers University, New Brunswick, NJ 08903, USA

Prof. E. Lieb, Physics Department, Princeton University, P. O. Box 708, Princeton, NJ 08540, USA

Prof. J. Moser, New York University, Courant Institute of Mathematical Sciences, 251 Mercer Street, New York, NY 10012, USA

Prof. K. Osterwalder, E. T. H. Zentrum, CH-8092 Zürich, Switzerland

Prof. D. Ruelle, IHES, F - 91440 Bures-sur-Yvette, France

Prof. B. Simon, Jadwin Physics Laboratory, Princeton University, Princeton, NJ 08540, USA

Prof. Ya. G. Sinai, L. D. Landau Institute for Theoretical Physics, Academy of Sciences, Vorobyevskoe Shosse, 2, 117334 Moscow, USSR

Prof. R. Stora, from Sept. 1, 78 to Aug. 31, 79: CERN, Theory Division, CH-1211 Geneva 23, Switzerland

Mathematical methods with direct relevance to physics

Quantum fields and statistical mechanics

General relativity, cosmology

Quantum mechanics

Fluid mechanics

Conceptual structure

Chief Editor

Nonequilibrium statistical mechanics

Equilibrium statistical mechanics

Classical dynamical systems

Constructive quantum field theory and general theory of quantized fields

Dissipative dynamical systems

Scattering theory and atomic physics

Statistical physics and dynamical systems

Lagrangian quantum field theory

100 offprints of each article will be supplied to the author free-of-charge and additional copies may be obtained at cost price if ordered before the issue goes to press.

Subscription Information

Volumes 64-70 (3 issues each) will appear in 1979. The price of each volume is DM 158.— or \$ 79.00. Information about obtaining back volumes and microform editions is available upon request.

North America. Subscription rate: \$ 576.50, including postage and handling. Subscriptions are entered with prepayment only. Orders should be addressed to: Springer-Verlag New York Inc., Service Center Secaucus, 44 Hartz Way, Secaucus, NJ 07094, USA, Telephone (201) 348-4033, Telex 0023125994.

All Other Countries. Subscription rate: DM 1106.—, plus postage and handling. Orders can either be placed with your bookdealer or sent directly to: Springer-Verlag, Heidelberg Platz 3, D-1000 Berlin 33.

Springer-Verlag

Journal Production Dept. I
Postfach 105280
D-6900 Heidelberg 1
Telephone (06221) 487332
Telex 04-61690

Springer-Verlag

Heidelberg Platz 3
D-1000 Berlin 33
Telephone (030) 822001
Telex 01-83319

Springer-Verlag New York Inc.

175 Fifth Avenue
New York, NY 10010, USA
Telephone (212) 477-8200
Telex 0023232235