Communications in Mathematical Physics

Volume 82 Number 4 1982

M	R	Rue	skai
	D.	nu	snai

H. P. McKean, E. Trubowitz

F. W. Shultz W. J. M. A. Hochstenbach

P. J. Holmes, J. E. Marsden

M. Göpfert, G. Mack

Absence of Discrete Spectrum in Highly Negative lons 457 The Spectral Class of the Quantum-Mechanical Harmonic Oscillator 471 Pure States as a Dual Object for *C**-Algebras 497 Quasi-Free Photon States and the Poincaré Group 511 Horseshoes in Perturbations of Hamiltonian Systems with Two Degrees of Freedom 523 Proof of Confinement of Static Quarks in 3-Dimensional *U*(1) Lattice Gauge Theory for all Values of the Coupling Constant 545

Indexed in Current Contents



Springer-Verlag Berlin Heidelberg New York

Commun. Math. Phys. ISSN 0010-3616 CMPHAY 82(4) 457-606 (1982)

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.

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 nor the editors nor the publisher can accept legal responsibility for errors or omissions that may have been made. The publisher makes no warranty, express of implied, with respect to the material contained herein.

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., 21 Congress Street, Salem, MA 01970, USA. 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." They should be aware that manuscripts which are not properly marked require additional time for publication. Manuscripts should be sent to:

<i>Prof. H. Araki,</i> Research Institute for Mathematical Sciences, Kyoto University, Kyoto, 606, Japan	Mathematical methods with direct relevance to physics
<i>Prof. J. Glimm,</i> The Rockefeller University, 1230 York Avenue, New York, NY 10021, USA	Fluid mechanics
Prof. R. Haag, II. Institut für Theoretische Physik, Luruper Chaussee 149, D-2000 Hamburg 50, Federal Republic of Germany	Conceptual structure
Prof. A. Jaffe, Lyman Laboratory of Physics, Harvard University, Cambridge, MA 02138, USA	Chief Editor
Prof. O. Lanford, Department of Mathematics, University of California, Berkeley, CA 94720, USA	Dynamical Systems
<i>Prof. J. L. Lebowitz,</i> Department of Mathematics, Rutgers University, New Brunswick, NJ 08903, USA	Nonequilibrium statistical mechanics
<i>Prof. E. Lieb,</i> Physics Department, Princeton University, P. O. Box 708, Princeton, NJ 08544, USA	Equilibrium statistical mechanics
<i>Prof. J. Moser,</i> Department of Mathematics, E. T. H. Zentrum, CH-8092 Zürich, Switzerland	Classical dynamical systems
Prof. K. Osterwalder, E.T.H. Zentrum, CH-8092 Zürich, Switzerland	Constructive quantum field theory and general theory of quantized fields
<i>Prof. B. Simon</i> , Department of Mathematics, California Institute of Technology, Pasadena, CA 91125, USA	Scattering theory and atomic physics
<i>Prof. Ya. G. Sinai</i> , L. D. Landau Institute for Theoretical Physics, Academy of Sciences, Vorobyevskoe Shosse, 2, 117334 Moscow, USSR	Statistical physics and dynamical systems
<i>Prof. T. Spencer,</i> Courant Institute, New York University, 251 Mercer Street, New York, NY 10012, USA	Disordered Systems
Prof. R. Stora, CERN, Theory Division, CH-1211 Geneva 23, Switzerland	Lagrangian quantum field theory
<i>Prof. ST. Yau,</i> School of Mathematics, The Institute for Advanced Study, Princeton, NJ 08540, USA	Relativity; Geometry and Physics

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

Subscription Information. Vols. 82-85 (3-4 issues each) will appear in 1982. Information about obtaining back volumes and microform editions available upon request.

Change of address. Six weeks should be allowed for all changes to become effective. All communications should include both old and new addresses (with postal codes) and should be accompanied by an address label from a recent issue. *North America.* Annual subscription rate: US\$855.00, 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.

Members of the International Association of Mathematical Physics (IAMP) are entitled to receive the journal strictly for their own personal use at a special reduced rate. The orders must be placed through the IAMP.

All Other Countries. Annual subscription rate: DM 1416.00, plus postage and handling. Airmail delivery on request only, For Japan, postage (Surface Airmail Lifted) and handling is DM 134.40.

Orders for all countries except North America can either be placed with your bookdealer or sent directly to: Springer-Verlag, Heidelberger Platz 3, D-1000 Berlin 33.

Offices

Springer-Verlag, Journal Department I, Postfach 105 280, D-6900 Heidelberg 1, Telefon (0 62 21) 4 87-1, Telex 04-61 690 Springer-Verlag, Heidelberger Platz 3, D-1000 Berlin 33, Telefon (0 30) 82 07-1, Telex 01-83 319 Springer-Verlag, New York Inc., 175 Fifth Avenue, New York, NY 10010, Telefon (2 12) 477-8 200, Telex 2 32 235