

# Communications in Mathematical Physics

**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publication, the authors agree to automatic transfer of the copyright to the publisher, and that the manuscript will not be published elsewhere in any language without the consent of the copyright holders.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. 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.

The Canada Institute for Scientific and Technical Information (CISTI) provides a comprehensive, world-wide document delivery service for all Springer-Verlag journals. For more information, or to place an order for a copyright-cleared Springer-Verlag document, please contact Client Assistant, Document Delivery, Canada Institute for Scientific and Technical Information, Ottawa K1A 0S2, Canada (Tel.: 613-993-9251, Fax 613-952-8243; e-mail. cistr.docdel@nrc.ca).

**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:**

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

*Mathematical methods with direct relevance to physics*

*Prof. D. Brydges*, Department of Mathematics, University of Virginia, Charlottesville, VA 22903, USA

*Statistical physics, quantum field theory*

*Prof. A. Connes*, I.H.E.S., F-91440 Bures-sur-Yvette, France

*Quantum physics and differential geometry*

*Prof. R. Dijkgraaf*, Department of Mathematics, University of Amsterdam, Plantage Muidergracht 24, NL-1018 TV Amsterdam, The Netherlands

*String theory, conformal field theory and related topics*

*Prof. J.-P. Eckmann*, Département de Physique Théorique, Université de Genève, 32, Boulevard d'Ivoy, CH-1211 Genève 4, Switzerland

*Dynamical systems*

*Prof. G. Felder*, Department of Mathematics, University of North Carolina, Chapel Hill, NC 27599, USA

*Quantum field theory*

*Prof. M.E. Fisher*, Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, USA

*Statistical physics*

*Prof. M. Herman*, Centre de Mathématiques Pures, Ecole Polytechnique, F-91128 Palaiseau Cedex, France

*Classical dynamical systems*

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

*Chief Editor*

*Prof. M. Jimbo*, Department of Mathematics, Kyoto University, Kitashirakawa Oiwake-cho, Sakyo-ku, Kyoto 606, Japan

*Integrable systems and related topics*

*Prof. A. Kupiainen*, Department of Mathematics, Helsinki University, P. O. Box 4, Hallituskatu 15, SF-00014 Helsinki, Finland

*Disordered systems, non-linear PDE's of mathematical physics*

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

*Nonequilibrium statistical mechanics*

*Prof. B. Simon*, Department of Mathematics, California Institute of Technology, Pasadena, CA 91125, USA

*Schrödinger operators and atomic physics*

*Prof. Ya. G. Sinai*, Department of Mathematics, Fine Hall, Princeton University, Princeton, NJ 08544-1000, USA

*Statistical physics and dynamical systems*

*Prof. S.-T. Yau*, Department of Mathematics, Harvard University, 1 Oxford Street, Cambridge, MA 02138, USA

*Relativity; geometry and physics*

## Subscription Information (ISSN 0010-3616)

Vols 166-173 (3 issues each) will appear in 1995. **North America.** Recommended annual subscription rate: US \$3700 00, single issue price \$188.00, including carriage charges. Subscriptions are entered with prepayment only. Orders should be addressed to: Springer-Verlag New York Inc., Journal Fulfillment Services Dept., 333 Meadowlands Parkway, Secaucus, NJ 07094, USA, Tel (201) 348-4033, Telex 023125994, Fax (201)348-4505. 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.** Recommended annual subscription rate. DM 5920.00, plus carriage charges: [Germany: DM 85.20 incl. VAT; all other countries. DM 133.20] SAL or airmail charges are available upon request. SAL delivery is mandatory to Japan, India, and Australia/New Zealand. Airmail delivery to all other countries is available upon request. Volume price. DM 740.00, single issue price. DM 296.00 plus carriage charges. Orders for all countries except North America can either be placed with your bookdealer or sent directly to: Springer-Verlag, Postfach 311 340, D-10643 Berlin, Germany, Tel 030/8207-1, Telex 0183319, Fax (030)/8207448. Cancellations must be received by September 30 to take effect at the end of the same year.

**Changes of Address:** Allow six weeks for all changes to become effective. All communications should include both old and new addresses (with Postal Codes) and should be accompanied by a mailing label from a recent issue. According to § 4 Sect. 3 of the German Postal Services Data Protection Regulations, if a subscriber's address changes the German Federal Post Office can inform the publisher of the new address even if the subscriber has not submitted a formal application for mail to be forwarded. Subscribers not in agreement with this procedure may send a written complaint to Springer-Verlag's Berlin office within 14 days of publication of this issue. **Back Volumes.** Prices are available on request. **Microform:** Microform editions are available from: University Microfilms International, 300 N Zeeb Road, Ann Arbor, MI 48106, USA.

## Production

Journal Production Department I, Springer-Verlag, Monika Ebert, Postfach 105280, D-69042 Heidelberg, Germany. **Address for courier, express and registered mail:** Tiergartenstrasse 17, D-69121 Heidelberg, Germany, Tel.(0) 62 21/4 87-431, Telex 0461723, Fax (0)6221-487624

Communications in  
**Mathematical  
Physics**

Chief Editor A. Jaffe, Cambridge, MA

Editorial Board H. Araki, Kyoto  
D. Brydges, Charlottesville, VA  
A. Connes, Bures-sur-Yvette  
R. Dijkgraaf, Amsterdam  
J.-P. Eckmann, Genève  
G. Felder, Chapel Hill, NC  
M. E. Fisher, College Park, MD  
M. Herman, Palaiseau  
M. Jimbo, Kyoto  
A. Kupiainen, Helsinki  
J. L. Lebowitz, New Brunswick, NJ  
B. Simon, Pasadena, CA  
Ya. G. Sinai, Princeton, NJ  
S.-T. Yau, Cambridge, MA

Advisory Board M. F. Atiyah, Oxford  
L. Faddeev, St. Petersburg  
F. Hirzebruch, Bonn  
R. Schrieffer, Santa Barbara, CA  
I. Singer, Cambridge, MA  
C. N. Yang, Stony Brook, NY

Responsible for Advertisements

Springer-Verlag  
Printers  
Printed in Germany

E. Lückermann, M. Stresow, Heidelberger Platz 3, D-14197 Berlin, Germany  
Telephone: (030) 8207-1, Telex 01-85411, Fax (0)30/820 7300  
Berlin Heidelberg New York Tokyo Hong Kong Barcelona Budapest  
Saladruck, Berlin  
© Springer-Verlag Berlin Heidelberg 1995  
Springer-Verlag GmbH & Co KG, Berlin, Germany