

Communications in  
**Mathematical  
Physics**

Volume 57 1977

Chief Editor J. Glimm, New York, NY

Editorial Board H. Araki, Kyoto  
R. Geroch, Chicago, IL  
J. Ginibre, Orsay  
R. Haag, Hamburg  
A. Jaffe, Cambridge, MA  
J. L. Lebowitz, New Brunswick, NJ  
E. Lieb, Princeton, NJ  
J. Moser, New York, NY  
R. Stora, Marseille

Advisory Board G. Gallavotti, Rome  
K. Hepp, Zürich  
R. Jost, Zürich  
M. C. Polivanov, Moscow  
D. Ruelle, Bures-sur-Yvette  
A. S. Wightman, Princeton, NJ



Springer-Verlag  
Berlin Heidelberg New York

The exclusive copyright for all languages and countries, including the right for photomechanical and any other reproduction, also in microform, is transferred to the publisher.

Alle Rechte, einschließlich das der Übersetzung in fremde Sprachen und das der fotomechanischen Wiedergabe oder einer sonstigen Vervielfältigung, auch in Mikroform, vorbehalten. Jedoch wird gewerblichen Unternehmen für den innerbetrieblichen Gebrauch nach Maßgabe des zwischen dem Börsenverein des Deutschen Buchhandels e. V. und dem Bundesverband der Deutschen Industrie abgeschlossenen Rahmenabkommens die Anfertigung einer fotomechanischen Vervielfältigung gestattet. Wenn für diese Zeitschrift kein Pauschalabkommen mit dem Verlag vereinbart worden ist, ist eine Wertmarke im Betrage von DM 0,40 pro Seite zu verwenden. *Der Verlag läßt diese Beträge den Autorenverbänden zufließen.*

Springer-Verlag Berlin Heidelberg New York

Printers: Brühlsche Universitätsdruckerei, Lahn-Gießen

Printed in Germany — © by Springer-Verlag Berlin Heidelberg 1977

# Contents

Cantor, M.: The Existence of Non-trivial Asymptotically Flat Initial Data for Vacuum Spacetimes . . . . .	83
Cegła, W., Jadczyk, A. Z.: Causal Logic of Minkowski Space . . . . .	213
Cuntz, J.: Simple $C^*$ -Algebras Generated by Isometries . . . . .	173
De Angelis, G. F., Falco, D. de, Guerra, F.: Scalar Quantum Electrodynamics on the Lattice as Classical Statistical Mechanics . . . . .	201
Dimock, J.: The Non-relativistic Limit of $\mathcal{P}(\varphi)_2$ Quantum Field Theories: Two-Particle Phenomena . . . . .	51
Dobrushin, R. L., s. Fritz, J. . . . .	67
Efimov, G. V.: Strong Coupling in the Quantum Field Theory with Nonlocal Nonpolynomial Interaction . . . . .	235
Fainberg, V. Ya., Soloviev, M. A.: Causality, Localizability, and Holomorphically Convex Hulls . . . . .	149
Falco, D. de, s. De Angelis, G. F., et al. . . . .	201
Fannes, M., Verbeure, A.: Correlation Inequalities and Equilibrium States. II . . . . .	165
Frigerio, A., s. Kossakowski, A., et al. . . . .	97
Fritz, J., Dobrushin, R. L.: Non-Equilibrium Dynamics of Two-dimensional Infinite Particle Systems with a Singular Interaction . . . . .	67
Gorini, V., s. Kossakowski, A., et al. . . . .	97
Guerra, F., s. De Angelis, G. F., et al. . . . .	201
Hegerfeldt, G. C.: Correlation Inequalities for Ising Ferromagnets with Symmetries . . . . .	259
Heifets, E. P., Osipov, E. P.: The Energy-Momentum Spectrum in the Yukawa <sub>2</sub> Quantum Field Theory . . . . .	31
Iagolnitzer, D., Stapp, H. P.: The Pole-Factorization Theorem in $S$ -Matrix Theory . . . . .	1
Jadczyk, A. Z., s. Cegła, W.: . . . . .	213
Kossakowski, A., Frigerio, A., Gorini, V., Verri, M.: Quantum Detailed Balance and KMS Condition . . . . .	97
Kupsch, J.: On the Existence of Crossing Symmetric and Unitary Scattering Amplitudes with Regge Poles . . . . .	219
Liu, T.-P.: The Deterministic Version of the Glimm Scheme . . . . .	135
Osipov, E. P.: Connection between the Spectrum Condition and the Lorentz Invariance of the Yukawa <sub>2</sub> Quantum Field Theory . . . . .	111
Osipov, E. P., s. Heifets, E. P. . . . .	31
Pearson, D. B.: The Dirac Operator with Highly Singular Potentials . . . . .	117
Rosenberg, J.: Amenability of Crossed Products of $C^*$ -Algebras . . . . .	187
Soloviev, M. A., s. Fainberg, V. Ya. . . . .	149
Stapp, H. P., s. Iagolnitzer, D. . . . .	1
Suzuki, M.: On the Convergence of Exponential Operators — the Zassenhaus Formula, BCH Formula and Systematic Approximants . . . . .	193
Verbeure, A., s. Fannes, M. . . . .	165
Verri, M., s. Kossakowski, A., et al. . . . .	97
Weder, R.: Absence of Classical Lumps . . . . .	161

Indexed in Current Contents



# Communications in Mathematical Physics

Volume 57 Number 1 1977

- D. Iagolnitzer, H. P. Stapp The Pole-Factorization Theorem in  $S$ -Matrix Theory 1
- E. P. Heifets, E. P. Osipov The Energy-Momentum Spectrum in the Yukawa<sub>2</sub> Quantum Field Theory 31
- J. Dimock The Non-relativistic Limit of  $\mathcal{P}(\varphi)_2$  Quantum Field Theories: Two-Particle Phenomena 51
- J. Fritz, R. L. Dobrushin Non-Equilibrium Dynamics of Two-dimensional Infinite Particle Systems with a Singular Interaction 67
- M. Cantor The Existence of Non-trivial Asymptotically Flat Initial Data for Vacuum Spacetimes 83

Indexed in Current Contents



Springer-Verlag  
Berlin Heidelberg New York

# Communications in Mathematical Physics

**It is a fundamental condition that submitted manuscripts have not been, and will not be, simultaneously submitted elsewhere.**

With the acceptance of a manuscript for publication the publisher acquires the sole copyright for all languages and countries.

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

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.

Manuscripts may be sent to:

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

*Mathematical methods (Functional analysis, operator algebra and group theory, with direct relevance to physics)*

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

*General relativity*

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

*Quantum mechanics*

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

*Chief Editor, Fluid mechanics*

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

*General structure of quantum field theory and foundations of quantum mechanics*

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

*Constructive quantum field theory*

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

*Nonequilibrium statistical mechanics (Time development of infinite systems, ergodic theory, transport theory, random processes, dissipative phenomena)*

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

*Equilibrium statistical mechanics*

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

*Dynamical systems (Differential equations and their application to physical systems), classical mechanics*

*Prof. R. Stora*, Centre National de la Recherche Scientifique, Centre de Physique Théorique, 31, chemin J. Aiguier, F-13274 Marseille, Cedex 2, France

*Lagrangian quantum field theory*

In order to avoid delay in publication this journal appears in loose numbers which can be subsequently assembled in volumes.

## Subscription Information

Volumes 52—57 (3 issues each) will appear in 1977. Information about obtaining back volumes and microform editions available upon request.

**All Countries (Except North America).** Subscription rate: DM 888,—, plus postage and handling. Orders can either be placed with your bookdealer or sent directly to: Springer-Verlag, Heidelbergberger Platz 3, D-1000 Berlin 33.

**North America.** Subscription rate: \$ 374.30, including postage and handling. Subscriptions are entered with prepayment only. Orders should be addressed to: Springer-Verlag New York Inc., 175 Fifth Avenue, New York, NY 10010, USA.

### Springer-Verlag

Journal Production Dept. I  
Postfach 105 280  
D-6900 Heidelberg 1  
Telephone (0 62 21) 487-1  
Telex 04-61690

### Springer-Verlag

Heidelbergberger Platz 3  
D-1000 Berlin 33  
Telephone (030) 82 20 01  
Telex 01-83 319

### Springer-Verlag

**New York Inc.**  
175 Fifth Avenue  
New York, NY 10010, USA  
Telephone (212) 477-8200  
Telex 23-2235