

HEAT AND MASS TRANSFER

in porous media

EDITORS ■ M. QUINTARD • M. TODOROVIĆ

ELSEVIER ■

蘇子瞻

ISBN 0444 89498-5

PDG

Statistical Physics and Dynamical Systems

Rigorous Results

**J. Fritz,
A. Jaffe, and
D. Szász, editors**

Statistical Physics and
Dynamical Systems
Rigorous Results
PDG

Editors

J. Fritz
MTA MKI
Realtanoda u. 13-15
H-1053 Budapest
(Hungary)

A. Jaffe
Dept. of Physics
Lyman Laboratory
Harvard University
Cambridge, MA 02138 (USA)

D. Szász
MTA MKI
Realtanoda u. 13-15
H-1053 Budapest
(Hungary)

Library of Congress Cataloging in Publication Data

Main entry under title:

Statistical physics and dynamical systems.

(Progress in physics ; vol. 10)

»Contains most of the invited papers of the
Second Colloquium and Workshop on »Random Fields:
Rigorous Results in Statistical Mechanics« held in
Köszeg, Hungary between August 26 and September 1,
1984« -- CIP pref.

Includes bibliographies.

1. Random fields -- Congresses. 2. Statistical
mechanics -- Congresses. 3. Quantum field theory --
Congresses. I. Fritz, J. II. Jaffe, Arthur, 1937-
III. Szász, D. IV. Colloquium and Workshop on »Random
Fields : Rigorous Results in Statistical Mechanics«
(2nd : 1984 : Köszeg, Hungary) V. Series: Progress
in physics (Boston, Mass.) ; v. 10.

QC174.85.R36S73 1985 530.1'3 85-1235

ISBN 0-8176-3300-6

CIP-Kurztitelaufnahme der Deutschen Bibliothek

**Statistical physics and dynamical systems : rigorous
results / J. Fritz . . . , ed. - Boston ; Basel ;
Stuttgart : Birkhäuser, 1985.**

(Progress in physics ; Vol. 10)

ISBN 3-7643-3300-6 (Basel . . .)

ISBN 0-8176-3300-6 (Boston)

NE: Fritz, Jozsef [Hrsg.]; GT

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval
system, or transmitted, in any form or by any means, electronic,
mechanical, photocopying, recording or otherwise, without the prior
permission of the copyright owner.

© 1985 Birkhäuser Boston, Inc.

Printed in Germany

ISBN 0-8176-3300-6

ISBN 3-7643-3300-6

PREFACE

This volume contains most of the invited papers of the Second Colloquium and Workshop on "Random Fields": Rigorous Results in Statistical Mechanics" held in Kőszeg, Hungary between August 26 and September 1, 1984. Invited papers whose authors could finally not attend the Colloquium are also included.

The Colloquium was organized by the generous sponsorship of the International Union for Pure and Applied Physics, the International Workshop Committee for Theoretical Physics, the International Association of Mathematical Physics, the Hungarian Academy of Sciences and the János Bolyai Mathematical Society.

Members of the International Program Committee were R. L. Dobrushin, A. Jaffe, J. L. Lebowitz, D. Ruelle, Ya. G. Sinai. The Organizing Committee consisted of J. Fritz, D. Szász (co-chairmen), D. Petz (secretary), A. Krámlí, G. Lippner, P. Lukács, P. Major, A. Sütő, N. Simányi, A. Vetier.

There were 112 participants from 21 countries representing all the six continents. There were altogether 22 forty-five minute invited talks and 63 ten minute contributed papers. The Workshop was organized on the last two days of the Colloquium. It mainly concerned topics most interesting for Hungarian physicists and, moreover, its program ensured additional space for discussions.

We express our sincere gratitude to Dénes Petz for his careful work as the technical editor of this volume and to Zsuzsa Erő for her excellent and rapid retyping of several manuscripts.

The Editors

P R O G R A M

Monday

10.00	Opening Ceremony
10.20 - 11.05	<u>R. L. Dobrushin</u> - <u>S. B. Shlosman</u> : Constructive criteria of uniqueness and analyticity in statistical mechanics
11.10 - 11.55	<u>J. L. Lebowitz</u> : Mathematical and physical ideas in nonequilibrium statistical mechanics
3.00 - 3.45	<u>E. Lieb</u> : Various estimates for the eigenvalues of the Laplacian
3.50 - 4.35	<u>H. Araki</u> : C^* -algebra approach to the ground states of the X-Y model
coffee break	
5.00 - 5.45	<u>M. Aizenmann</u> : Rigorous studies of critical behaviour
5.50 - 6.35	<u>D. Kazhdan</u> : ϵ -representations
7.30	Welcome party

Tuesday

9.00 - 9.45	<u>A. Kupiainen</u> : Non-trivial continuum limit for negative coupling ϕ_4^4
9.50 - 10.35	<u>G. Papanicolau</u> : Bulk diffusion and self diffusion for interacting Brownian motions
coffee break	
11.00 - 11.45	<u>O. E. Lanford</u> : Renormalization group methods for mappings with golden-ratio rotation number
10.50 - 12.00	<u>H. Rost</u> : Equilibrium fluctuations for a one-dimensional nearest neighbour model
12.02 - 12.12	<u>A. Verbeure</u> : States stationary for the detailed balance of reversible processes
12.14 - 12.24	<u>M. F. Chen</u> : Jump Markov processes and interacting particle systems

- 12.26 - 12.36 Ra. Siegmund-Schulze: On existence of non-equilibrium dynamics of multidimensional infinite particle systems: the translation invariant case
- 12.38 - 12.48 J. Fritz: Interacting Brownian particles: existence and self-adjointness
- 3.00 - 3.10 A. Krámlí - D. Szász: The problem of recurrence for Lorentz processes
- 3.12 - 3.22 D. Dawson: Ensemble and multilevel models of critical behaviour
- 3.24 - 3.34 K. Fleischman: Occupation time processes at a critical point
- 3.36 - 3.46 J. A. Galves - E. Olivieri - M. E. Vares: Metastable behaviour of stochastic systems: a pathwise approach
- 3.48 - 3.58 J. R. Klauder: Langevin equations for statistical computations
- 4.00 - 4.10 N. Ianiri: Stationary Boltzman-equation
- 4.12 - 4.22 G. Jetschke: On stochastic nonlinear parabolic differential equations
- 4.24 - 4.34 P. Calderoni: On the Smoluchowski limit for simple particle systems
- 4.36 - 4.46 H. Cranel: Stochastic systems on manifolds
- coffee break
- 5.14 - 5.24 C. A. Hurst: C^* -algebra approach to the Pfaffian method for the Ising model
- 5.26 - 5.36 J. T. Lewis - J. V. Pulè: Phase transitions and the weak law of large numbers
- 5.38 - 5.48 K. Kuroda: The Pirogov-Sinai theory of phase transitions for continuum systems
- 5.50 - 6.00 Y. Higuchi: A weak version of Russo-Seymour-Welsh theorem for the two-dimensional Ising model
- 6.02 - 6.12 L. Laanait - A. Messenger - J. Ruiz: Phases coexistence and surface tension for the Potts model
- 6.14 - 6.24 B. Tóth: A lower bound for the critical probability of square-lattice site percolation
- 6.26 - 6.36 D. Merlini: On the Temperley conjecture for the two-dimensional Ising model
- 6.38 - 6.48 V. Warstat: A uniqueness theorem for systems of interacting polymers at low temperature
- 6.50 - 7.00 M. Arató: The distribution of stochastic integrals

Wednesday

- 9.00 - 9.45 E. Presutti - Ya. G. Sinai - M. Soloviechik: Hyperbolicity and Möller-morphism for a model of classical statistical mechanics
- 9.50 - 10.35 Yu. M. Suhov - A. G. Shuhov: Linear and related models of time evolution in quantum statistical mechanics
- coffee break
- 11.00 - 11.45 R. Caflisch: Thermal layers for the Boltzmann equation
- 11.50 - 12.00 J. K. Percus: Evaluation of a class of functional integral
- 12.02 - 12.12 J. Bricmont - J. Fröhlich: Random walks and the particle structure of lattice gauge theories
- 12.14 - 12.24 D. Surgailis: On continuous contour-models and Arak fields
- 12.16 - 12.36 G. F. Lawler: Intersection properties of simple random walks
- 12.38 - 12.48 P. Major: Renormalization of Dyson's hierarchical vector-valued model at low temperatures

Thursday

- 9.00 - 9.45 L. Accardi: Quantum probability
- 9.50 - 10.35 H. Spohn: Equilibrium fluctuations for some stochastic particle systems
- coffee break
- 11.00 - 11.45 C. Marchioro: Some problems in vortex theory
- 11.50 - 12.00 C. Kipnis: Asymptotics for the motion of a tagged particle in the simple exclusion model
- 12.02 - 12.12 J. R. Fontaine - Ph. A. Martin: Equilibrium equations and Ward identities for Coulomb systems
- 12.14 - 12.24 Ch. Gruber: On the invariance of charged systems with respect to external fields
- 12.26 - 12.36 J. Jedrzejewski: Phase transitions in models of itinerant electrons
- 12.38 - 12.48 G. Schlijper: Rigorous results for approximate variational principles
- 3.00 - 3.10 D. Dürr: On Harris' collision model
- 3.12 - 3.22 H. Rodehausen: Diffusive behaviour for a class of Ornstein-Uhlenbeck processes
- 3.24 - 3.34 J. Gärtner: On long-time fluctuations of weakly interacting diffusions

3.36 - 3.46	<u>A. Krámli</u> - <u>N. Simányi</u> - <u>D. Szász</u> : Transport phenomena and random walks with internal states
3.48 - 3.58	<u>Y. Elskens</u> - <u>H. L. Frisch</u> : Annihilation dynamics in one dimension
4.00 - 4.10	<u>P. Ferrari</u> - <u>E. Presutti</u> - <u>M. E. Vares</u> : Hydrodynamical properties of a zero-range model
4.12 - 4.22	<u>D. Szász</u> - <u>B. Tóth</u> : One-dimensional persistent random walks in random environment
4.24 - 4.34	<u>W. A. Majewski</u> : On ergodic properties of dynamical semigroups
4.36 - 4.46	<u>A. Wakolbinger</u> : Time-reversal co-dimensional diffusions
coffee break	
5.14 - 5.24	<u>S. Pogosian</u> : Cluster property of classical spin systems
5.26 - 5.36	<u>B. Nahapetian</u> : Limit theorems for weakly dependent random variables
5.38 - 5.48	<u>D. Petz</u> : Quasi entropies for finite quantum systems
5.50 - 6.00	<u>H. Baumgärtel</u> : A class of nontrivial weakly local massive Wightman fields with interpolation properties
6.02 - 6.12	<u>I. Daubechies</u> - <u>J. R. Klauder</u> : Wiener measures for $\exp(-i\hbar H)$
6.14 - 6.24	<u>E. Brüning</u> : On the construction of random probability measures of infinite dimensional spaces
6.26 - 6.36	<u>K. H. Fichtner</u> - <u>G. Jetschke</u> : A probabilistic model of a quantum mechanical infinite particle system
6.38 - 6.48	<u>E. Orlandi</u> - <u>R. Figari</u> : Gaussian approximation for the Green's functions of Laplacian in a domain with random holes
6.50 - 7.00	<u>V. Schaffenberger</u> : Borel summability in the disorder parameter of the averaged Green's function for Gaussian disorder
coffee break	
7.20 - 7.30	<u>A. de Masi</u> - <u>P. Ferrari</u> : Diffusion in percolation regime I.
7.32 - 7.42	<u>P. Ferrari</u> - <u>A. de Masi</u> : Diffusion in percolation regime II.

- 7.44 - 7.54 R. Kotecky: On residual entropy models
 7.56 - 8.06 S. Olla: Large deviations and variational principles
 8.08 - 8.18 G. Royer: De Fortret-Mourier distance and log-concave functions

Friday

- 9.00 - 9.45 A. Katok: Random perturbations of dynamical systems motivation, conjectures, rigorous results
 9.50 - 10.35 M. Misiurewicz: Convergence of images of certain measures

coffee break

- 11.00 - 13.00 Discussions
 3.00 - 4.00 Discussions
 4.00 - 4.10 H. O. Georgii: On the critical temperature of disordered ferromagnets near the percolation threshold
 4.12 - 4.22 J. L. van Hemmen: Statistical mechanics of spin glasses
 4.24 - 4.34 H. Englisch - M. Endrulis: Random alloys and special energies

coffee break

- 5.00 - 5.10 F. Przytycki: Riemann maps and holomorphic dynamics
 5.12 - 5.22 S. Pirogov: Automata systems with defects
 5.24 - 5.34 A. Vetier: Ergodic properties of the Sinai billiard in an external field
 5.36 - 5.46 J. Kotus: Ω -stability of vector fields
 5.48 - 5.58 K. Ziemian: An almost sure invariance principle for some maps of an interval

Saturday

- 9.00 - 9.45 P. Collet: Phase transitions on diamond lattices
 9.50 - 10.35 L. Pastur: On the spectral theory of random and almost periodic operators
 10.40 - 11.25 B. Souillard: Transitions from pure point to continuous spectrum for random Schrödinger operators. Some examples
 11.30 - 12.00 Closing ceremony

LIST OF PARTICIPANTS

L. Accardi
Dip. di Matematica
Università di Roma II
Via Orazio Raimondo
I-00173 Roma
(Italy)

Á. Ág
MTA KFKI
PF. 49
H-1525 Budapest 114
(Hungary)

M. Aizenman
Dept. of Mathematics
Rutgers University
Busch Campus
New Brunswick, NJ 08903
(USA)

H. Araki
230-42 Iwakura-Nagatanicho
Sakyoku
Kyoto 606
(Japan)

M. Arató
Fehérvári út 129
H-1119 Budapest
(Hungary)

H. Baumgärtel
Inst. f. Mathematik
Mohrenstrasse 39
1086 Berlin
(DDR)

G. Benfatto
Via A. Fraccaroli, 7
I-00157 Roma
(Italy)

C. Boldrighini
Istituto Matematico
Università di Camerino
I-62032 Camerino
(Italy)

J. Bricmont
FYMA 2
Chemin du Cyclotron
B-1348 Louvain-La-Neuve
(Belgium)

R. Caflisch
Courant Institute
251 Mercer St.
New York, NY 10012
(USA)

P. Calderoni
ZIF Bielefeld Universität
Wellenberg 1
D-4800 Bielefeld
(FRG)

M. Campanino
Via Bisagno 14
I-00199 Roma
(Italy)

S. Caprino
Via Armando di Tullio 27
I-00136 Roma
(Italy)

Mu Fa Chen
Dept. of Mathematics
Beijing Normal University
Beijing
(Peoples' Republic of China)

G.S. Chobanov
Math. Inst. of the
Bulg. Acad. of Sci.
P.O.B. 373
1090 Sofia
(Bulgaria)

J.S. Cohen
Prinsengracht 1055 A-2
NL-1017 JE Amsterdam
(The Netherlands)

P. Collet
26, rue Vergniaud
F-75013 Paris
(France)

I. Daubechies
Wolfshaegen 33
B-3053 Huldenberg
(Belgium)

D. Dawson
2155 Delmar Dr.
Ottawa K1H 5P6
(Canada)

R. L. Dobrushin
Inst. of Problems of Transmission
of Information
Avia Motornaja 8
Moscow E - 24
(USSR)

D. Dürr
Ruhr-Universität Bochum
Inst. für Mathematik
Postfach 102148
D-4630 Bochum 1
(FRG)

Y. Elskens
Fac. de Sci.
Univ. Libre de Bruxelles
C.P. 231, Bvd. du Triomphe
B-1050 Bruxelles
(Belgium)

H. English
Steinstrasse 16
DDR-7030 Leipzig
(DDR)

R. Eposito
Piazzale Montesquieu 28 IA
I-00137 Roma
(Italy)

P.A. Ferrari
IHES
F-91440 Bures-Sur-Yvette
(France)

A. Fialowski
Villányi út 103
H-1118 Budapest
(Hungary)

K. Fleischmann
AdW d DDR
Institut für Mathematik
Mohrenstrasse 39
1086 Berlin
(DDR)

J.-R. Fontaine
3A Ch. des Esserts
CH-1024 Ecublens
(Switzerland)

J. Fritz
MTA MKI
Reáltanoda u. 13-15
H-1053 Budapest
(Hungary)

J.A. Galves
R. Riachuelo 296
13130 Sousas - S.P.
(Brasil)

J. Gärtner
AdW d DDR
Institut für Mathematik
Mohrenstrasse 39
1086 Berlin (DDR)

H.-O. Georgii
Sperlingweg 7
D-8031 Eichenau (FRG)

V. Gorini
Dip. di Fisica
Sez. Fis Teor.
Via Celoria 16
I-20133 Milano
(Italy)

Ch. Gruber
Inst. Phys. Théor.
EPL-Lausanne
CH-1015 Lausanne
(Switzerland)

Y. Higuchi
Dept. of Mathematics
Kobe University
Rokko
Kobe 657
(Japan)

C.A. Hurst
99 Fifth Avenue
Joslin, South Australia 5070
(Australia)

N. Ianiro
Via Urbana 143
I-00100 Roma
(Italy)

K.R. Ito
ZiF, Univ. Bielefeld
Wellenberg 1
D-4800 Bielefeld 1 (FRG)

J. Jedrzejewski
Budziszyńska 135/5
Wroclaw
(Poland)

G. Jetschke
Friedrich-Schiller Universität
Sektion Mathematik
DDR-6900 Jena (DDR)

A. Katok
1080 Spruce Str.
Berkeley, Calif. (USA)

D. Kazhdan
Harvard University
Mathematics Department
1 Oxford Street
Cambridge, MA 02138 (USA)

C. Kipnis
17 Rue Mathis
F-75019 Paris
(France)

J.R. Klauder
AT and T Bell Labs
Murray Hill, NJ 07974 (USA)

R. Kotecký
Dept. Math. and Phys.
V. Holesovickách 2
Praha 8
(Czechoslovakia)

J. Kotus
Szczęślińska 29 m 29
P-02-353 Warsaw
(Poland)

A. Krámlí
MTA SZTAKI
Victor Hugo u. 18-22
H-1132 Budapest
(Hungary)

R. Kuik
Sloep 299
NL-9732 CT Groningen
(The Netherlands)

A. Kupiainen
Abrahamink. 17 C59
Helsinki 18
(Finland)

K. Kuroda
Dept. of Math. Keio University
Hiyoski 3-14-1
Kohoku-ku
Yokohama 223
(Japan)

L. Laanait
C.P.T. CNRS
Luminy Case 907
F-13288 Marseille Cedex 9
(France)

O.E. Lanford
Inst. des Hautes Etudes Sci.
35, Route de Chartres
F-91440 Bures-Sur-Yvette
(France)

G.F. Lawler
311 S. Lasalle St. Apt. 30 A
Durham, NC 27705 (USA)

J.L. Lebowitz
52 Locust Lane
Princeton, NJ 08546 (USA)

G. Leha
Bavariastrasse 2
D-8551 Pinzberg (FRG)

J.T. Lewis
San Clemente, Vico Rd.
Dalkey, County Dublin
(Ireland)

E. Lieb
Jadwin Hall
P.O.B. 708
Princeton, NJ 08544 (USA)

G. Lippner
BME Villamosmérnöki Kar Mat. Tsz.
Műgyetem rkp. 3-9
H-1111 Budapest
(Hungary)

P. Lukács
MTA SZTAKI
Victor Hugo u. 18-22
H-1132 Budapest
(Hungary)

W.A. Majewski
Inst. Theor. Phys. Astrophys.
Univ. Gdańsk
Wita Stwosza 75
P-80-952 Gdańsk
(Poland)

P. Major
MTA MKI
Reáltanoda u. 13-15
H-1053 Budapest
(Hungary)

C. Marchioro
Dip. di Matematica
Università di Trento
I-38050 Trento
(Italy)

R. Marra
Piazzale Montesquieu 28/A
I-00137 Roma
(Italy)

A. de Masi
Ist. Matematica Univ. dell'Aquila
Aquila
(Italy)

D. Merlini
Mathematisches Institut
Ruhr-Universität
D-4630 Bochum (FRG)

M. Misiurewicz
Asfaltowa 7/5
Warsaw
(Poland)

B.S. Nahapetian
Inst. Math. Armenian SSR
ul. Barekamutian 24
Yerevan (USSR)

S. Olla
Via Bandello 52
I-09100 Cagliari
(Italy)

E. Omerti
Dip. di Matematica
Univ. di Trento
I-38050 Povo (Trento)
(Italy)

E. Orlandi
Dep. Mat. "G. Castelnuovo"
Città Universitaria
Piazzale A. Moro
I-00100 Roma
(Italy)

G. Papanicolaou
Current Institute
251 Mercer Str.
New York, NY 10012 (USA)

L. Pastur
Pr. Lenina 47
Harkov (USSR)

J.K. Percus
340 Riverside Dr.
New York, NY 10025 (USA)

D. Petz
MTA MKI
Reáltanoda u. 13-15
H-1053 Budapest
(Hungary)

S.A. Pirogov
IPPI AN USSR
Ermolovoi str. 19
101447 Moscow GSP-4 (USSR)

S.K. Pogossian
Inst. Mat. Armenian SSR
ul. Barekamutian 24
Yerevan (USSR)

E. Presutti
Dip. di Matematica
Univ. di Roma
I-00185 Roma
(Italy)

F. Przytycki
ul. Puszczyka 17 m 80
P-02777 Warszawa
(Poland)

M. Pulvirenti
Via A. di Tullio 27
I-00136 Roma
(Italy)

A.G. Schlijper
Clavecimbellaan 399
NL-2287 VP Rijswijk
(The Netherlands)

M. Rattner
Dept. of Math.
University of California
Berkeley, CA 94720 (USA)

R. Siegmund-Schulze
Elsa Brandström-Str. 38
1100 Berlin (DDR)

M. Rédei
Rákó u. 47/a
H-1112 Budapest
(Hungary)

N. Simányi
Rózsa F. u. 5
H-2440 Százhalombatta
(Hungary)

H. Rodenhausen
Schlierbacher Lanstr. 154
D-6900 Heidelberg (FRG)

B. Souillard
4 et 6 Rue Saint Nicolas
F-75012 Paris
(France)

H. Rost
Seidenweg 7
D-6907 Nussloch (FRG)

H. Spohn
Theoretische Physik
Theresienstr. 37
D-8000 München 2 (FRG)

G. Royer
13 rue Jules Cuillerier
F-94140 Alfortville
(France)

A.K. Stepanov
Inst. Fiz. AN SSSR
Moskovskoe Obl.
Černogolovka (USSR)

J. Ruiz
CPT CNRS
Luminy Case 907
F-13288 Marseille Cedex 9
(France)

Yu.M. Suchov
IPPI AN SSSR
Ermolovoi St. 19
101447 Moscow GSP-4 (USSR)

E. Scaciatelli
Dip. Matematica
Univ. di Roma
Piazzale Aldo Moro 5
I-00100 Roma
(Italy)

D. Surgailis
Inst. of Math. and Cyb.
232600 Vilnius
Pozelos 54 (USSR)

U. Scharfenberger
Eckenheimer Landstr. 72
D-6000 Frankfurt (FRG)

A. Sütő
MTA KFKI
Pf. 49
H-1525 Budapest 114
(Hungary)

D. Szász
MTA MKI
Reáltanoda u. 13-15
H-1053 Budapest
(Hungary)

K. Szlachányi
MTA KFKI
Pf. 49
H-1525 Budapest 114
(Hungary)

B. Tóth
MTA MKI
Reáltanoda u. 13-15
H-1053 Budapest
(Hungary)

L. Triolo
Univ. degli Studi di Roma
Dip. Mat.
Via A. Scarpa
I-00161 Roma
(Italy)

M. Urbański
ul. Gagarina 45 HA-2
P-87-100 Toruń
(Poland)

M. Vares
Rua Sorocaba 484, Apt. 301 F
Botafogo
Rio de Janeiro
(Brasil)

P. Vecsernyés
MTA KFKI
Pf. 49
H-1525 Budapest 114
(Hungary)

A. Verbeure
Leuvense Straat 5
B-3050 Oud-Heverlee
(Belgium)

A. Vetier
BME Villamosmérnöki Kar
Matematika Tanszéke
Műegyetem rkp. 3-9
H-1111 Budapest
(Hungary)

A. Wakolbinger
Reinprechtenstr. 2
A-4040 Fuchsenau
(Austria)

J. Westwater
Dept. of Mathematics
Univ. of Washington
Seattle, WA 98195 (USA)

V. Warstat
Schönitzstr. 19
DDR-4020 Halle (DDR)

W.D. Wick
Phys. Dept.
Princeton Univ.
Princeton, NJ 08540 (USA)

G. Winkler
Alranstr. 17
D-8000 München 70 (FRG)

M. Winnink
Inst. for Theor. Physics
P.O.B. 800
Groningen
(The Netherlands)

K. Ziemian
ul. Na Uboczu 24 m 64
P-02802 Warszawa
(Poland)