Lecture Notes in Physics

Editors: J. Ehlers, K. Hepp, R Kippenhahn, H. A. Weidenmüller, J. Zittartz

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New Volumes:

Volume 116

Mathematical Problems in Theoretical Physics

Proceedings of the International Conference on Mathematical Physics Held in Lausanne, Switzerland, August 20–25, 1979
Editor: K Osterwalder
1980. VIII, 412 pages
DM 47,–; approx US $ 27.80   ISBN 3-540-09964-6

These proceedings of the International Conference on Mathematical Physics contain seven survey lectures on Schrödinger operators (Combes, Hunziker), on statistical mechanics (Lieb, Lanford III), on quantum field theory Bros, Jaffe) and on gauge theory (Olive). Numerous contributions of the highest scientific quality are presented in addition to the main lectures. These short contributions also cover problems from the theory of dynamical systems, super-symmetry and group theory and C*-algebra techniques. Quite a few of the shorter papers have the character of a review, making this volume of interest to students as well as to researchers.

Volume 117

Deep Inelastic Fusion Reactions with Heavy Ions

Proceedings of the Symposium Held at the Hahn-Meitner-Institut für Kernforschung, Berlin, October 23–25, 1979
Editor: W. v. Oertzen
1980. 1 figure in color. XIII, 394 pages
DM 49,–; approx. US $ 29.00   ISBN 3-540-09965-4

Contents:
Introductory. – Different Views on Deep Inelastic Collisions. – New Aspects of Deep Inelastic Collisions – Light-Particle Emission in Deep Inelastic Collisions. – High Energies and Incomplete Fusion. – Fusion Reactions with Heavy Ions.

In this volume experimental and theoretical physicists discuss various aspects of heavy ion reactions. Two survey lectures by J. R. Huizenga and M. Lefort serve as an excellent introduction to the problems to which this conference was devoted. Different views on fusion are then collected in five sections: various theoretical approaches, new experimental aspects, light particle emission, high energies and incomplete fusion, and fusion reactions of heavy ions.

Volume 118

Quantum Chromodynamics

Proceedings of the X G.I.F.T. International Seminar on Theoretical Physics Held at Jaca, Huesca (Spain) June 1979
Editors: J. L. Alonso, R. Tarrach
1980. IX, 424 pages
DM 47,–; approx. US $ 27.80   ISBN 3-540-09969-7

Contents:
E. de Rafael: Quantum Chromodynamics as a Theoretical Framework of the Hadronic Interactions. – *C. T. Sachrajda:* Applications of Perturbative QCD to Hard Scattering Processes. – *H. L. Lynch:* Experimental Aspects of Quantum Chromodynamics. – *H. Fritzsch:* Masses and Mass Generations in Chromo and Flavour Dynamics. – *H. Leutwyler:* Hadrons. – *J. Bartels:* High Energy Behavior of Nonabelian Gauge Theories.

Volume 119

Nuclear Spectroscopy

Lecture Notes of the Workshop Held at Gull Lake, Michigan, August 27 – September 7, 1979
Editors: G. F. Bertsch, D. Kurath
1980. VII, 250 pages
DM 33,–; approx. US $ 19.50   ISBN 3-540-09970-0

The papers contained in this volume review the present status of nuclear structure physics. Nuclear theory's most important tool, the shell model representation, is described in contributions by Kurath, Bertsch and Faessler. Iachello's paper describes the use of group theory to simplify the description of complex spectra, an application that has developed into a high art. For spectral regions beyond the grasp of either the shell model or group theory, statistical considerations have an applicability that is only recently fully understood, as French explains. Brown's lectures cover the foundations of nuclear theory in the nonrelativistic reduction of nucleon-nucleon dynamics to derive on effective Hamilitonian. An appendix by Bertsch, Zamick and Mekjian brings to light numerous open problems.

Volume 120

Nonlinear Evolution Equations and Dynamical Systems

Proceedings of the Meeting Held at the University of Lecce June 20–23, 1979
Editors: M. Botti, F. Pempinelli, G. Soliani
1980. VI, 368 pages
DM 43,–; approx. US $ 25.40   ISBN 3-540-09971-9

The contributions to this volume discuss recent advances and future trends in the theory of nonlinear evolution equations, covering both their mathematical and physical aspects. The papers are expanded versions of talks presented at the conference which include more recent developments. Among the topics to be found in this volume are: the geometrical aspects of nonlinear solvable equations and the Bäcklund transformation– analytical techniques for finding solutions; the relation of the geometry of the dual spaces of Lie algebras to the complete integrability of certain nonlinear evolutions; the properties of special functions related to certain solutions; reduction techniques for matrix equations; applications to plasma turbulence; the relation of the inverse scattering problem to arithmetics and transcendental numbers, and applications to fundamental equations of classical and quantum physics.

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