BOOKS RECEIVED

The Journal of Geometry and Physics publishes brief announcements of new books of high scientific or pedagogical value and of wide interest, in the area of Geometry and Physics. Some of the books announced will be reviewed.

A complimentary copy of the book to be announced should be sent to the Editorial Office. There is no charge for the announcements.

1

H. UMEZAWA, G. VITIELLO: Quantum mechanics. Monographs and textbooks in physical science, Lecture notes N.1, Bibliopolis, Napoli, 1985, p. 278.

CONTENTS: Invariant transformations in classical mechanics; invariant transformations in the matrix mechanics; realizations of canonical variables, time dependent representation; spin, magnetic moment, parity and statistics; scattering theory, preliminary considerations; the elastic scattering.

2

A. ASHTEKAR: Asymptotic quantization. Monographs and textbooks in physical science, Lecture notes N.2, Bibliopolis, Napoli, 1987, p. 107.

CONTENTS: Quantum gravity; asymptotic quantization: radiative modes of the gravitational field in exact general relativity; quantization of radiative modes.

3

M. FRANCAVIGLIA: Elements of differential and Riemannian geometry. Monographs and textbooks in physical science, Lecture notes N.4, Bibliopolis, Napoli, 1988, p. 171.

CONTENTS: Manifolds, Lie groups, fibred manifolds, tensor bundles; inner product, geodesics, linear connections, Riemannian connections, differential operators, Hodge duality, isometries, conformal transformations.

4

A. ASHTEKAR, L. BOMBELLI, J. LEE, D. ROBINSON, T. JACOBSON, C. TORRE, L. SMOLIN, P. RENTELN, C. ROVELLI: New perspectives in canonical gravity. Monographs and textbooks in physical science, Lecture notes N.5, Bibliopolis, Napoli, 1988, p. 324.

CONTENTS: Survey, symplectic framework, the initial value formulation, the standard hamiltonian formulation; classical theory, spinors, lagrangian formulation, hamiltonian formulation, the weak field limit, the strong coupling limit; quantum theory, geometric quantization, the general program, the weak field limit; frontiers, half-flat solution of Einstein equation and hyperkähler structures, supergravity, the BRST formalism in general relativity, CP violation in quantum gravity, exact solutions to the quantum hamiltonian connstraints, knot theory, loop space and the diffeomorphism group, a new lattice regularization for quantum gravity, loop space representation.

5

P. A. HORVATHY: Introduction to monopoles. Monographs and textbooks in physical science, Lecture notes N.6, Bibliopolis, Napoli, 1988, p. 96.

CONTENTS: The Dirac monopole, gauge theory, spontaneous symmetry breaking, models of

unified field theories, 't Hooft-Polyakov monopoles, topological sectors, topological charges, the non Abelian charge, generalized charge quantization.

6

M.HENNAUX: Classical foundation of BRST symmetry. Monographs and textbooks in physical science, Lecture notes N.7, Bibliopolis, Napoli, 1988, p. 95.

CONTENTS: Exterior calculus on supermanifolds, supersymplectic geometry; constrained hamiltonian systems; structure of first class constrained systems, BRST symmetry, BRST cohomology in classical mechanics, BRST cohomology and exterior derivative operator along the gauge orbits.

7

G. MARMO, C. RUBANO: Particle dynamics on fibre bundles. Monographs and textbooks in physical science, Lecture notes N.8, Bibliopolis, Napoli, 1988, p.104.

CONTENTS: Lagrangian formalism and the inverse problem, the electron monopole system, the global Lagrangian, dynamics on Lie groups, motion of a particle in a Yang-Mills field; the Kaluza-Klein setting.

8

L. DABROWSKI: Group actions on spinors. Monographs and textbooks in physical science, Lecture notes N.9, Bibliopolis, Napoli, 1988, p. 116.

CONTENTS: Clifford algebras, spinors; spin structures, prolongation of a structure group to its central extension; gauge transformations, diffeomorphisms and Weyl rescalings, diffeomorphisms and spinors on torus and on compactified Minkowski space-time, spaces quotiented by a discrete group, orientable and non orientable surfaces, connection and covariant derivative, Dirac operator.

9

W. M. TULCZYJEW: Geometric formulations of physical theories. Monographs and textbooks in physical science, Lecture notes N.11, Bibliopolis, Napoli, 1989, p. 129.

CONTENTS: Differential geometry, manifolds, fibrations, tangent and cotangent bundles, differential forms and derivations; Lagrangian submanifolds of the cotangent bundle, static systems; Lagrangian formulation of dynamics of mechanical systems; Hamiltonian formulation of dynamics of mechanical systems; examples.

10

E. CARTAN: On manifolds with an affine connection and the theory of general relativity. Monographs and textbooks in physical science, N.1, Bibliopolis, Napoli, 1986, p. 199.

CONTENTS: The dynamics of continuous media and the notion of an affine connection on space-time; the fundamental properties of manifolds with an affine connection; manifolds with a metric connection; the theory of curves and surfaces on a manifold with an affine or a metric connection; space-time in Newtonian and Einsteinian theories of gravitation; the group of affine motion associated with a point of a manifold with an affine connection; torsion and curvature tensors of a manifold with an affine and a metric connection; three and four dimensional manifolds with a metric connection; on generalized conformal spaces and the optical universe.

11

A. TRAUTMAN: Differential geometry for physicists. Monographs and textbooks in physical science, Lecture notes N.2, Bibliopolis, Napoli, 1984, p.145.

CONTENTS: Algebra, differential manifolds, Lie groups, fibre bundles, connections and gauge fields, examples of non trivial bundles occurring in physics, topological invariants and characteristic classes, literature.

12

A.P. BALACHANDRAN, C.G. TRAHERN: Lectures on group theory for physicists. Monographs and textbooks in physical science, Lecture notes N.3, Bibliopolis, Napoli, 1984, p.175.

CONTENTS: Groups, simple and semi-simple groups, representations, characters. Lie groups, Lie algebras, representations of Lie algebras, simple and semi-simple Lie algebras. Classical groups.

13

W. RINDLER, A. TRAUTMAN Ed.: Gravitation and geometry. Monographs and textbooks in physical science, Lecture notes N.4, Bibliopolis, Napoli, 1987, p.505.

CONTENTS: W. RINDLER, A. TRAUTMAN: Introduction. P.C. AICHELBURG, F. EMBACHER: Lightlike contraction in curved space-time. J.L. ANDERSON, E.A. SPIEGEL: Line formation in relativistically expanding atmosphere. J. BICAK: Radiative properties of space-times with the axial and boost symmetries. M. CAHEN, S. GUTT: An algebraic construction of * product on the regular orbits of semisiple Lie groups. Y. CHOQUET-BRUHAT: Spin 1/2 fields in arbitrary dimension of the Einstein-Cartan theory. R. DEBEVER: On Einstein-Maxwell null fields in type D. S. DESER: The ubiquitous Bel-Robinson tensor. J.D. FINLEY III: Toward real valued HH space: twisting type N. J.N. GOLDBERG: D-invatriance on a null surface. I. HAUSER, F.J. ERNST: A new proof of an old conjecture. P.A. HOGAN, A. TRAUTMAN: On gravitational radiation from bounded sources. L.P. HUGSTON: Application of SO(8) spinors. N. KAMRAN, R.G. MCLENAGHAN: Separation of variables for hihger spin, zero rest-mass field equations on type D vacuum backgrounds with cosmological constant. J. LEROY: A radiative, twisting, type II, Aligned Einstein-Maxwell field. Y. NE'EMAN: Search for the equation of infinite-component word-spinor field. I. OZVATH: All homogeneous solutions of Einstein's vacuum field equations with a non vanishing cosmological term. R. PENROSE: On the origins of twistor theory. J.F. BLEBANSKI: On conformally flat spaces and cosmological models. J.R. PORTER: Asymptoticaly-flat radiation structures. N. ROSEN, G.E. TAUBER: A generalization of an Einstein-Mayer theory. E. SCMUTZER: Projective relativity and quantum fields. E.L. SCHUCKING, J.Z. WANG: The two dimensional ivor. J. STACHEL: Congruences of subspaces. H. URBANTKE: On complex-valued scalar waves of the simply-progressive type. P.B. YASSKIN: An ambitwistor approach for gravity. J.W. YORK, Jr.: Bel-Robinson gravitational superenergy and flatness.

14

I.M. BENN, R.W. TUCKER: An introduction to spinors and geometry with applications in physics. Adam Hilger, Bristol and Philadelphia, 1987, p.1-358.

CONTENTS: Tensor algebra, Clifford algebras and spinors, pure spinors and triality; manifolds, applications in physics, connections, gravitation, Clifford calculus on manifolds, spinor fields, spinor field equations.