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Nota di contenuto	Quantization, Geometry and Noncommutative Structures in Mathematics and Physics (A. Cardona, H. Ocampo, P. Morales, S. Paycha, A.F. Reyes Lega (Eds.)) -- General Overview (Alexander Cardona, Sylvie Paycha and Andrés F. Reyes Lega) -- Introduction -- Poisson Geometry and Classical Dynamics -- Geometric and Deformation Quantization -- Noncommutative Geometry and Quantum Groups -- Deformation Quantization and Group Actions (Simone Gutt) -- What do we mean by quantization? -- Deformation Quantization -- Fedosov's star products on a symplectic manifold -- Classification of Poisson deformations and star products -- Star products on Poisson manifolds and formality -- Group actions in deformation quantization -- Reduction in deformation quantization -- Some remarks about convergence -- . Principal fiber bundles in non-commutative geometry (Christian Kassel) -- Introduction -- Review of principal fiber bundles -- Basic ideas of non-commutative geometry -- From groups to Hopf

algebras -- Quantum groups associated with SL2(C) -- Group actions in non-commutative geometry -- Hopf Galois extensions -- Flat deformations of Hopf algebras -- An Introduction to Nichols Algebras (Nicolás Andruskiewitsch) -- Preliminaries -- Braided tensor categories -- Nichols algebras -- Classes of Nichols algebras -- Quantum Field Theory in Curved Space-Time (Andrés F. Reyes Lega) -- Introduction -- Quantum Field Theory in Minkowski Space-Time -- Quantum Field Theory in Curved Space-Time -- Cosmology -- An Introduction to Pure Spinor Superstring Theory (Nathan Berkovits and Humberto Gomez) -- Introduction -- Particle and Superparticle -- Pure Spinor Superstring -- Appendix -- Introduction to Elliptic Fibrations (Mboyo Esole) -- Introduction -- Elliptic curves over C -- Elliptic fibrations -- Kodaira-Néron classification of singular fibers -- Miranda models -- Batalin–Vilkovisky formalism as a theory of integration for polyvectors (Pierre J. Clavier and Viet Dang Nguyen) -- Motivations and program -- BV integral -- Gauge fixing -- Master equations -- Conclusion -- Split Chern-Simons theory in the BV-BFV formalism (Alberto S. Cattaneo, Pavel Mnev, and Konstantin Wernli) -- Introduction -- Overview of the BV and BV-BFV formalisms -- Chern-Simons theory as a BF-like theory -- Split Chern-Simons theory on the solid torus -- Conclusions and outlook -- Weighted direct product of spectral triples (Kevin Falk) -- Introduction and motivation. -Weighted direct product of spectral triples -- Example of weighted direct product with Toeplitz operators -- Index.

| Sommario/riassunto | This monograph presents various ongoing approaches to the vast topic of quantization, which is the process of forming a quantum mechanical system starting from a classical one, and discusses their numerous fruitful interactions with mathematics. The opening chapter introduces the various forms of quantization and their interactions with each other and with mathematics. A first approach to quantization, called deformation quantization, consists of viewing the Planck constant as a small parameter. This approach provides a deformation of the structure of the algebra of classical observables rather than a radical change in the nature of the observables. When symmetries come into play, deformation quantization needs to be merged with group actions, which is presented in chapter 2, by Simone Gutt. The noncommutativity arising from quantization is the main concern of noncommutative geometry. Allowing for the presence of symmetries requires working with principal fiber bundles in a non-commutative setup, where Hopf algebras appear naturally. This is the topic of chapter 3, by Christian Kassel. Nichols algebras, a special type of Hopf algebras, are the subject of chapter 4, by Nicolás Andruskiewitsch.   The purely algebraic approaches given in the previous chapters do not take the geometry of space-time into account. For this purpose a special treatment using a more geometric point of view is required. An approach to field quantization on curved space-time, with applications to cosmology, is presented in chapter 5 in an account of the lectures of Abhay Ashtekar that brings a complementary point of view to non-commutativity. An alternative quantization procedure is known under the name of string theory. In chapter 6 its supersymmetric version is presented. Superstrings have drawn the attention of many mathematicians, due to its various fruitful interactions with algebraic geometry, some of which are described here. The remaining chapters discuss further topics, as the Batalin-Vilkovisky formalism and direct products of spectral triples. This volume addresses both physicists and mathematicians and serves as an introduction to ongoing research in very active areas of mathematics and physics at the border line between geometry, topology, algebra and quantum field theory. |