Dirac Kets Gamow Vectors And Gelfand Triplets The Rigged Hilbert Space Formulation Of Quantum Mechanics Lectures In Mathematical Physics At The Of Texas At Austin Lecture Notes In Physics

This book presents a variety of techniques for tackling phenomena that are not amenable to the conventional approach based on the concept of probabilities. The methods described rely on the use of path integration, thermal Green functions, time-temperature propagators, Liouville operators, second quantization, and field correlators at finite density and temperature. Also exploring the statistical mechanics of unstable quantum systems, the book is intended as a supplementary or reference text for use in one-semester graduate courses on Quantum Mechanics, Thermodynamics, Electromagnetism, and Mathematical Methods in Physics.

Algebras of bounded operators are familiar, either as C*-algebras or as von Neumann algebras. A first generalization is the notion of algebras of unbounded operators (O*-algebras), mostly developed by the Leipzig school and in Japan (for a review, we refer to the monographs of K. Schmüdgen [1990] and A. Inoue [1998]). This volume goes one step further, by considering systematically partial *-algebras of unbounded operators (partial O*-algebras) and the underlying algebraic structure, namely, partial *-algebras. It is the first textbook on this topic. The first part is devoted to partial O*-algebras, basic properties, examples, topologies on them. The climax is the generalization to this new framework of the celebrated modular theory of Tomita-Takesaki, one of the cornerstones for the applications to statistical physics. The second part focuses on abstract partial *-algebras and their representation theory, obtaining again generalizations of familiar theorems (Radon-Nikodym, Lebesgue).

This is an introductory graduate course on quantum mechanics, which is presented in its general form by stressing the operator approach. Representations of the algebra of the harmonic oscillator and of the algebra of angular momentum are determined in chapters 1 and 2 respectively. The algebra of angular momentum is enlarged by adding the position operator so that the algebra can be used to describe rigid and non-rigid rotating molecules. The combination of quantum physical systems using direct-product spaces is discussed in chapter 3. The theory is used to describe a vibrating rotator, and the theoretical predictions are then compared with data for a vibrating and rotating diatomic molecule. The formalism of first- and second-order non-degenerate perturbation theory and first-order degenerate perturbation theory are derived in chapter 4. Time development is described in chapter 5 using either the Schroedinger equation of motion or the Heisenberg’s one. An elementary mathematical tutorial forms a useful appendix for the readers who don’t have prior knowledge of the general mathematical structure of quantum mechanics.

Dirac's formalism of quantum mechanics was always praised for its elegance. This book introduces the student to its mathematical foundations and demonstrates its ease of applicability to problems in quantum physics. The book starts by describing in detail the concept of Gel'fand triplets and how one can make use of them to make the Dirac heuristic approach rigorous. The results are then deepened by giving the analytic tools, such as the Hardy class function and Hilbert and Mellin transforms, needed in applications to physical problems. Next, the RHS model for decaying states based on the concept of Gamow vectors is presented. Applications are given to physical theories of such phenomena as decaying states and resonances.

In this volume, leading experts in experimental as well as theoretical physics (both classical and quantum) and probability theory give their views on many intriguing (and still mysterious) problems regarding the probabilistic foundations of physics. The problems discussed during the conference include EinsteinOCoPodolskyOCoRosen paradox, Bell's inequality, realism, nonlocality, role of Kolmogorov model of probability theory in quantum physics, von Mises frequency theory, quantum information, computation, OC quantum effectsOCO in classical physics. Contents: Locality and Bell's Inequality (L Accardi & M Regoli); Refutation of Bell's Theorem (G Adenier); Forcing Discretization and Determination in Quantum History Theories (B Coecke); Some Remarks on Hardy Functions Associated with Dirichlet Series (W Ehm); Ensemble Probabilistic Equilibrium and Non-Equilibrium Thermodynamics without the Thermodynamic Limit (D H E Gross); An Approach to Quantum Probability (S Gudder); Innovation Approach to Stochastic Processes and Quantum Dynamics (T Hida); Origin of Quantum Probabilities (A Khrennikov); OC ComplementarityOCO or Schizophrenia: Is Probability in Quantum Mechanics Information or Onta? (A F Kracklauer); A Probabilistic Inequality for the KochenOCoSpecker Paradox (J-A Larsson); Quantum Stochastics. The New Approach to the Description of Quantum Measurements (E Loubenets); Is Random Event a Core Question? Some Remarks and a Proposal (P Rocchi); Quantum Cryptography in Space and Bell's Theorem (I Volovich); and other papers. Readership: Graduate students and researchers in quantum physics, mathematical physics, theoretical physics, stochastic processes, and probability & statistics."

The Bia?owie?a Workshops on Geometric Methods in Physics, which are hosted in the unique setting of the Bia?owie?a natural forest in Poland, are among the most important meetings in the field. Every year some 80 to 100 participants from both the mathematics and physics world join to discuss new developments and to exchange ideas. The current volume was produced on the occasion of the 32nd meeting in 2013. It is now becoming a tradition that the Workshop is followed by a School on Geometry and Physics, which consists of advanced lectures for graduate students and young researchers. Selected speakers at the 2013 Workshop were asked to contribute to this book, and their work was supplemented by additional review articles. The selection shows that, despite its now long tradition, the workshop remains at the cutting edge of research. The 2013 Workshop also celebrated the 75th birthday of Daniel Sternheimer, and on this occasion the discussion mainly focused on his contributions to mathematical physics such as deformation quantization, Poisson geometry, symplectic geometry and non-commutative differential geometry.

The idea of editing the present volume in the Lecture Notes in Physics series arosewhileorganizingthe“ConferenceonIrreversibleQuantumDynamics”that took place at The Abdus Salam International Center for Theoretical Physics, Trieste, Italy, from July 29 to August 2, 2002. The aim of the Conference was to bring together di?erent groups of - searcherswhoseinterestsandpursuitsinvolveirreversibilityandtimeasymmetry in quantum mechanics. The Conference promoted open and in-depth exchanges of di?erent points of view, concerning both the content and character of qu- tum irreversibility and the methodologies used to study it. The following main themes were addressed: • Theoretical Aspects of Quantum Irreversible Dynamics • Open Quantum Systems and Applications • Foundational Aspects of Irreversible Quantum Dynamics • Asymmetric Time Evolution and Resonances Eachthemewasreviewedbyanexpertinthe?eld,accompaniedbymorespeci?c, research-like shorter talks. The whole topic of quantum irreversibility in all its manifold aspects has always raised a lot of interest, starting with the description of unstable systems in quantum mechanics and the issue of quantum measurement. Further, in - cent years a boost of activity concerning noise, dissipation and open systems has been prompted by the fast developing ?eld of quantum communication and information theory. These considerations motivated the editors to put together a volume that tries to summarize the present day status of the research in the ?eld, with the aim of providing the reader with an accessible and exhaustive introduction to it.

This important volume describes the wide-ranging scientific activities of L,on Van Hove, through commentaries by his colleagues and a selection of his most influential papers and documents. The reprinted papers are grouped by topic, starting from his early work in mathematics and theoretical and statistical physics, up to his very last contributions in elementary particle physics and multiparticle dynamics. Van Hove's career as teacher, director and science advisor in many European institutions is presented in sketches by friends and coworkers. A selection of his speeches and documented thoughts on science

completes the volume.

Develops quantum theory from its basic assumptions, beginning with statics, followed by dynamics and details of applications and the needed computational techniques. Most of the book deals with particle systems, as that is where most of the applications lie; the treatment of quantum field theory is confined to fundamental ideas and their consequences.

Robert Eugene Marshak (1916–92) devoted much of his life to helping other people carry out scientific research and gather to discuss their work. In addition to his scientific statesmanship, he was an extraordinarily gifted research scientist, and many of his scientific contributions have been prophetic. This book pays homage to his creativity and continuing work, with contributions from many of the people whose lives have been influenced by him. Contents:Impact of Direct Transfer Reactions on Nuclear Structure Studies (R K Bansal & A Kumar)Evidence for Exotics (G Bhamathi)Chiral Morphing (N-P Chang)Cosmological S Matrix (G Chew)The Anomalous Magnetic Moment of the Muon (V W Hughes)Constituent Quark Mass in Relation to Current Quark Mass (S Iwao)Mesons and the Structure of Nucleons (W Koepf et al.)The Pain and Joy of a Major Scientific Discovery (R E Marshak)Understanding the Standard Model (R N Mohapatra)Extensions of the Standard Model (R J Oakes)CP Violations in D± and B± Boson Decays (S Okubo)Remembering Robert Eugene Marshak (J B Platt)A Prophetic Physicist (J Polkinghorne)Atomic Clocks and Tests of Relativity (N F Ramsey)The Relationship between Theory and Experiment in Physics (R G Sachs)Marshak, Kuiper, Adams, and Moore: White Dwarfs and Nuclear Interactions (M P Savedoff)and other papers Readership: High energy physicists. keywords:

The Wigner Symposia deal with the most recent developments in those mathematical areas which were introduced to physics by E P Wigner, and also with related fields. The central themes of the proceedings of the 5th Wigner Symposium (WigSym5) are quantum algebras and groups, group-theoretical developments, quantum field theory and geometry, and phase space formulations of quantum mechanics. The proceedings also contain papers on the application of these techniques in various branches of physics, and many contributions in which fundamental mathematical and epistemological questions related to the foundations of quantum theory are discussed.

This volume gives an overview of the recent representative developments in relativistic and non-relativistic quantum theory, which are related to the application of various mathematical notions of various symmetries. These notions are centered upon groups, algebras and their generalizations, and are applied in interaction with topology, differential geometry, functional analysis and related fields. The emphasis is on results in the following areas: foundation of quantum physics, quantization methods, nonlinear quantum mechanics, algebraic quantum field theory, gauge and string theories, discrete spaces, quantum groups and generalized symmetries.

This book presents the up-to-date status of quantum theory and the outlook for its development in the 21st century. The covered topics include basic problems of quantum physics, with emphasis on the foundations of quantum theory, quantum computing and control, quantum optics, coherent states and Wigner functions, as well as on methods of quantum physics based on Lie groups and algebras, quantum groups and noncommutative geometry.

Advances in Quantum Chemistry presents surveys of current developments in this rapidly developing field that falls between the historically established areas of mathematics, physics, and chemistry. With invited reviews written by leading international researchers, as well as regular thematic issues, each volume presents new results and provides a single vehicle for following progress in this interdisciplinary area. Volume 47 is a tribute in honor of Professor Osvaldo Goscinski. The volume will look at the accomplishments of a man who has led a remarkable development within the field and developed and strengthened scientific networks in Quantum Chemistry and Chemical Physics. Provides a tribute in honor of Professor Osvaldo Goscinski, a man who has led a remarkable development within the field

Symmetry is permeating our understanding of nature: Group theoretical methods of intrinsic interest to mathematics have expanded their applications from physics to chemistry and biology. The ICGTMP Colloquia maintain the communication among the many branches into which this endeavor has bloomed. Lie group and representation theory, special functions, foundations of quantum mechanics, and elementary particle, nuclear, atomic, and molecular physics are among the traditional subjects. More recent areas include supersymmetry, superstrings and quantum gravity, integrability, nonlinear systems and quantum chaos, semigroups, time asymmetry and resonances, condensed matter, and statistical physics. Topics such as linear and nonlinear optics, quantum computing, discrete systems, and signal analysis have only in the last few years become part of the group theorists' turf. In Group Theoretical Methods in Physics, readers will find both review contributions that distill the state of the art in a broad field, and articles pointed to specific problems, in many cases, preceding their formal publication in the journal literature.

The physics and mathematics of nonlinear dynamics, chaotic and complex systems constitute some of the most fascinating developments of late twentieth century science. It turns out that chaotic bahaviour can be understood, and even utilized, to a far greater degree than had been suspected. Surprisingly, universal constants have been discovered. The implications have changed our understanding of important phenomena in physics, biology, chemistry, economics, medicine and numerous other fields of human endeavor. In this book, two dozen scientists and mathematicians who were deeply involved in the "nonlinear revolution" cover most of the basic aspects of the field.

Emergent quantum mechanics explores the possibility of an ontology for quantum mechanics. The resurgence of interest in "deeper-level" theories for quantum phenomena challenges the standard, textbook interpretation. The book presents expert views that critically evaluate the significance—for 21st century physics—of ontological quantum mechanics, an approach that David Bohm helped pioneer. The possibility of a deterministic quantum theory was first introduced with the original de Broglie-Bohm theory, which has also been developed as Bohmian mechanics. The wide range of perspectives that were contributed to this book on the occasion of David Bohm’s centennial celebration provide ample evidence for the physical consistency of ontological quantum mechanics. The book addresses deeper-level questions such as the following: Is reality intrinsically random or fundamentally interconnected? Is the universe local or nonlocal? Might a radically new conception of reality include a form of quantum causality

or quantum ontology? What is the role of the experimenter agent? As the book demonstrates, the advancement of ‘quantum ontology’—as a scientific concept—marks a clear break with classical reality. The search for quantum reality entails unconventional causal structures and non-classical ontology, which can be fully consistent with the known record of quantum observations in the laboratory.

In this volume, leading experts in experimental as well as theoretical physics (both classical and quantum) and probability theory give their views on many intriguing (and still mysterious) problems regarding the probabilistic foundations of physics. The problems discussed during the conference include Einstein?Podolsky?Rosen paradox, Bell's inequality, realism, nonlocality, role of Kolmogorov model of probability theory in quantum physics, von Mises frequency theory, quantum information, computation, ?quantum effects? in classical physics.

With contributions by leading quantum physicists, philosophers and historians, this comprehensive A-to-Z of quantum physics provides a lucid understanding of key concepts of quantum theory and experiment. It covers technical and interpretational aspects alike, and includes both traditional and new concepts, making it an indispensable resource for concise, up-to-date information about the many facets of quantum physics.

One of the most enduring elements in theoretical physics has been group theory. GROUP 24: Physical and Mathematical Aspects of Symmetries provides an important selection of informative articles describing recent advances in the field. The applications of group theory presented in this book deal not only with the traditional fields of physics, but also include such disciplines as chemistry and biology. Awarded the Wigner Medal and the Weyl Prize, respectively, H.J. Lipkin and E. Frenkel begin the volume with their contributions. Plenary session contributions are represented by 18 longer articles, followed by nearly 200 shorter articles. The book also presents coherent states, wavelets, and applications and quantum group theory and integrable systems in two separate sections. As a record of an international meeting devoted to the physical and mathematical aspects of group theory, GROUP 24: Physical and Mathematical Aspects of Symmetries constitutes an essential reference for all researchers interested in various current developments related to the important concept of symmetry.

This volume presents the state of the art in the research on new possibilities for communication and computation based on quantum theory and nonlocality, as well as related directions and problems. It discusses challenging issues: decoherence and irreversibility; nonlocality and superluminosity; photonics; quantum information and communication; quantum computation.

Dirac Kets, Gamow Vectors and Gel’fand TripletsThe Rigged Hilbert Space Formulation of Quantum Mechanics. Lectures in Mathematical Physics at the University of Texas at AustinSpringer

This volume focuses on developments in the field of group theory in its broadest sense and is of interest to theoretical and experimental physicists, mathematicians, and scientists in related disciplines who are interested in the latest methods and applications. In an increasingly ultra-specialized world, this volume will demonstrate the interchange of ideas and methods in theoretical and mathematical physics.

Hadronic atoms provide a unique laboratory for studying hadronic interactions essentially at threshold. This text is the first book-form exposition of hadronic atom theory with emphasis on recent developments, both theoretical and experimental. Since the underlying Hamiltonian is a non-self-adjoined operator, the theory goes beyond traditional quantum mechanics and this book covers topics that are often glossed over in standard texts on nuclear physics. The material contained here is intended for the advanced student and researcher in nuclear, atomic or elementary-particle physics. A good knowledge of quantum mechanics and familiarity with nuclear physics are presupposed. Contents:Theoretical Background:Hadronic Atoms — An OverviewExtended Quantum Mechanical FrameworkCoulomb Wave FunctionsCoulomb Propagator and Scattering OperatorsTwo-Potential Scattering FormalismBound States and Low-Energy ScatteringAtomic SpectrumGamow States and Completeness ProblemX-Ray Transition RateComputational MethodsExamplesChiral Theory PrimerComparison with Experiment:Two-Meson Atomic Bound StatesHadronic HydrogenHadronic DeuteriumHadronic Atoms with A?4 Readership: Graduate students and academics in nuclear, atomic, high-energy, computational, quantum and theoretical physics. Keywords:Advanced Quantum Mechanics;Atomic Physics;Elementary Particle Physics;Nuclear Physics

Spacetime Physics Research Trends

This volume gives a representative survey of recent developments in relativistic and non-relativistic quantum theory, which are related to the application of symmetries in their most general sense. The corresponding mathematical notions are centered upon groups, algebras and their generalizations, and are applied in interaction with topology, differential geometry, functional analysis and related fields. Special emphasis is on results in the following areas: quantization methods, nonlinear evolution equations, foundation of quantum physics, algebraic quantum field theory, gauge and string theories, quantum information, quantum groups, discrete symmetries.

Introduces many-body theory of modern quantum statistical mechanics to graduate students in physics, chemistry, engineering and biology.

Provides reader with working knowledge of Mathematica and key aspects of Mathematica symbolic capabilities, the real heart of Mathematica and the ingredient of the Mathematica software system that makes it so unique and powerful Clear organization, complete topic coverage, and an accessible writing style for both novices and experts Website for book with additional materials: http://www/MathematicaGuideBooks.org Accompanying DVD containing all materials as an electronic book with complete, executable Mathematica 5.1 compatible code and programs, rendered color graphics, and animations

This book is the second volume of the proceedings of the joint conference X. International Symposium “Quantum Theory and Symmetries” (QTS-X) and XII. International Workshop “Lie Theory and Its Applications in Physics” (LT-XII), 19–25 June 2017, Varna, Bulgaria. The QTS series started around the core concept that symmetries underlie all descriptions of quantum systems. It has since evolved into a symposium on the frontiers of theoretical and mathematical physics. The LT series covers the whole field of Lie Theory in its widest sense together with its applications in many facets of physics. As an interface between mathematics and physics the workshop serves as a meeting place for mathematicians and theoretical and mathematical physicists. In the division of the material between the two volumes, the Editor has tried to select for the first and second volumes papers that are more oriented toward mathematics and physics, respectively. However, this division is relative since many papers could have been placed in either volume. The topics covered in this volume represent the most modern trends in the fields of the joint conferences: symmetries in string theories, conformal field theory, holography, gravity theories and cosmology, gauge theories, foundations of quantum theory, nonrelativistic and classical theories.

This book explores the prospects of rivaling ontological and epistemic interpretations of quantum mechanics (QM). It concludes with a suggestion for how to interpret QM from an epistemological point of view and with a Kantian touch. It thus refines, extends, and combines existing approaches in a similar direction. The author first looks at current, hotly debated ontological interpretations. These include hidden variables-approaches, Bohmian mechanics, collapse interpretations, and the many worlds interpretation. He demonstrates why none of these

ontological interpretations can claim to be the clear winner amongst its rivals. Next, coverage explores the possibility of interpreting QM in terms of knowledge but without the assumption of hidden variables. It examines QBism as well as Healey's pragmatist view. The author finds both interpretations or programs appealing, but still wanting in certain respects. As a result, he then goes on to advance a genuine proposal as to how to interpret QM from the perspective of an internal realism in the sense of Putnam and Kant. The book also includes two philosophical interludes. One details the notions of probability and realism. The other highlights the connections between the notions of locality, causality, and reality in the context of violations of Bell-type inequalities.

INSTEAD OF A "FESTSCHRIFT" In June 1998 Hans Primas turned 70 years old. Although he himself is not fond of jubilees and although he likes to play the decimal system of numbers down as contingent, this is nevertheless a suitable occasion to reflect on the professional work of one of the rare distinguished contempo rary scientists who attach equal importance to experimental and theoretical and conceptual lines of research. Hans Primas' interests have covered an enormous range: methods and instruments for nuclear magnetic resonance, theoretical chemistry, C* - and W* -algebraic formulations of quantum me chanics, the measurement problem and its various implications, holism and realism in quantum theory, theory reduction, the work and personality of Wolfgang Pauli, as well as Jungian psychology. In many of these fields he provided important and original food for thought, in some cases going far beyond the everyday business in the scien tific world. As is the case with other scientists who are conceptually inno vative, Hans Primas is read more than he is quoted. His influence is due to his writings. Even with the current flood of publications, he still performs the miracle of having scientists eagerly awaiting his next publication.

This book presents the current status and research trends in Stochastic Analysis. Several new and emerging research areas are described in detail, highlighting the present outlook in Stochastic Analysis and its impact on abstract analysis. The book focuses on treating problems in areas that serve as a launching pad for continual research. Contents:Gaussian Measures on Infinite Dimensional Spaces (V I Bogachev)Random Fields and Hypergroups (Herbert Heyer)A Concise Exposition of Large Deviations (F Hiai)Quantum White Noise Calculus and Applications (Un Cig Ji and Nobuaki Obata)Weak Radon–Nikodým Derivatives, Dunford–Schwartz Type Integration, and Cramér and Karhunen Processes (Yûichirô Kakihara)Entropy, SDE–LDP and Fenchel–Legendre–Orlicz Classes (M M Rao)Bispectral Density Estimation in Harmonizable Processes (H Soedjak) Readership: Graduate students and researchers in Probability and Stochastic Analysis. Keywords:Stochastic Measures;Stochastic Differential Equations;RSA-Current TrendsKey Features:The book covers new developments in Stochastic AnalysisThe research works contain detailed exposition to induce new researchers

In Resonances, Instability, and Irreversibility: The Liouville Space Extension of Quantum Mechanics T. Petrosky and I. Prigogine Unstable Systems in Generalized Quantum Theory E. C. G. Sudarshan, Charles B. Chiu, and G. Bhamathi Resonances and Dilatation Analyticity in Liouville Space Erkki J. Brandas Time, Irreversibility, and Unstable Systems in Quantum Physics E. Eisenberg and L. P. Horwitz Quantum Systems with Diagonal Singularity I. Antoniou and Z. Suchanecki Nonadiabatic Crossing of Decaying Levels V. V. and Vl. V. Kocharovsky and S. Tasaki Can We Observe Microscopic Chaos in the Laboratory? Pierre Gaspard Proton Nonlocality and Decoherence in Condensed Matter -- Predictions and Experimental Results C. A. Chatzidimitriou-Dreismann "We are at a most interesting moment in the history of science. Classical science emphasized equilibrium, stability, and time reversibility. Now we see instabilities, fluctuations, evolution on all levels of observations. This change of perspective requires new tools, new concepts. This volume invites the reader not to an enumeration of final achievements of contemporary science, but to an excursion to science in the making." --from the Foreword by I. Prigogine What are the dynamical roots of irreversibility? How can past and future be distinguished on the fundamental level of description? Are human beings the children of time --or its progenitors? In recent years, a growing number of chemists and physicists have agreed that the solution to the problem of irreversibility requires an extension of classical and quantum mechanics. There is, however, no consensus on which direction this extension should take to include the dynamical description of irreversible processes. Resonances, Instability, and Irreversibility surveys recent attempts --both direct and indirect --to address the problem of irreversibility. Internationally recognized researchers report on their recent studies, which run the gamut from experimental to highly mathematical. The subject matter of these papers falls into three categories: classical systems with emphasis on chaos and dynamical instability, resonances and unstable quantum systems, and the general problem of irreversibility. Presenting the cutting edge of research into some of the most compelling questions that face contemporary chemical physics, Resonances, Instability, and Irreversibility is fascinating reading for professionals and students in every area of the discipline.

The concept of self-organization is at the heart of the theory of complex systems. It describes how order can emerge from disorder in otherwise chaotic nonlinear dynamical systems. This book investigates and surveys the role of self-organization in a wide variety of disciplines. The contributions are written by world-renowned scientists and philosophers at a level that is accessible to nonspecialists.

Leading research, perspectives, and analysis of dynamical systems and irreversibility Edited by Nobel Prize winner Ilya Prigogine and renowned authority Stuart A. Rice, the Advances in Chemical Physics series provides a forum for critical, authoritative evaluations in every area of the discipline. In a format that encourages the expression of individual points of view, experts in the field present comprehensive analyses of subjects of interest. Volume 122 collects papers from the XXI Solvay Conference on Physics, dedicated to the exploration of "Dynamical Systems and Irreversibility." Ioannis Antoniou, Deputy Director of the International Solvay Institutes for Physics and Chemistry, edits and assembles this cutting-edge research, including articles such as "Non-Markovian Effects in the Standard Map," "Harmonic Analysis of Unstable Systems," "Age and Age Fluctuations in an Unstable Quantum System," and discussion of many more subjects. Advances in Chemical Physics remains the premier venue for presentations of new findings in its field.

This volume shares and makes accessible new research lines and recent results in several branches of theoretical and mathematical physics, among them Quantum Optics,

Coherent States, Integrable Systems, SUSY Quantum Mechanics, and Mathematical Methods in Physics. In addition to a selection of the contributions presented at the "6th International Workshop on New Challenges in Quantum Mechanics: Integrability and Supersymmetry", held in Valladolid, Spain, 27-30 June 2017, several high quality contributions from other authors are also included. The conference gathered 60 participants from many countries working in different fields of Theoretical Physics, and was dedicated to Prof. Véronique Hussin—an internationally recognized expert in many branches of Mathematical Physics who has been making remarkable contributions to this field since the 1980s. The reader will find interesting reviews on the main topics from internationally recognized experts in each field, as well as other original contributions, all of which deal with recent applications or discoveries in the aforementioned areas.