

Bookmark File Quantum Phase Transitions In Transverse Field Spin Models From Statistical Physics To Quantum Information Read Pdf Free

Muon and Muonium Chemistry May 30 2021 This book covers all aspects of the chemical behaviour of the muon - a rare, short-lived, elementary particle having a mass intermediate between that of the proton and the electron. Muons provide an exceptional opportunity to investigate basic chemical interactions, simply because they are so short-lived: they can thus be studied using the powerful technique of muon spin rotation, in which the yield, decay rate and identity of the muon in several different states is observed. Although originally of principal interest to nuclear and particle physicists, muons have recently become important as probes in solid-state physics and in all phases of chemistry. This book will be a valuable source of information for research scientists, university teachers and graduate students interested in physical chemistry, chemical physics and the application of nuclear science to the life sciences.

EPR of Free Radicals in Solids Oct 23 2020 *EPR of Free Radicals in Solids: Trends in Methods and Applications* presents methods and applications of modern EPR for the study of free radical processes in solids, which so far are only available in the journal literature. The first part of the book, covering trends in methods, contains experimentally oriented chapters on continuous wave and pulsed EPR techniques and special methods involving muon magnetic resonance and optical detection and theory for dynamic studies. New simulation schemes, including the influence of dynamics, are presented as well as advances in the calculation of hyperfine and electronic g-tensors. The second part of the book presents applications involving studies of radiation and photo-induced inorganic and organic radicals in inert matrices, including novel results of quantum effects in small radicals. High-spin molecules and complexes are also considered as well as radical processes in photosynthesis. Recent advances in EPR dosimetry are summarized.

Quantum Dynamics in Rugged Energy Landscapes, and Additional Topics in Disordered Systems Mar 28 2021 This thesis concerns the interplay of quantum mechanics with strong disorder, and the novel dynamical phases that are unique to disordered quantum systems. The results that we present apply to systems ranging from spin glasses to granular superconductors to quantum-computational problems. In the first part, we discuss the isolated quantum dynamics of mean-field spin glass models, using the random energy and p-spin models in a transverse field as tractable examples. We show that the low-energy configurations are organized into clusters separated by macroscopic Hamming distances, and that the tunneling amplitudes between clusters are exponentially suppressed. As a result, we find three distinct dynamical phases. At small transverse field, the system remains trapped within its starting cluster (trapped phase). At intermediate transverse field, the system tunnels between clusters (tunneling phase). At large transverse field, the system is excited out of clusters (excitation phase). We describe the similarities and differences between the trapped phase and a many-body localized phase. We also discuss at length the implications for quantum-computational approaches to "matching" problems, in which one solution to a computational problem is used as a starting point to find others. Only in the tunneling phase can quantum dynamics solve the matching problem. Although necessarily exponentially slow in system size, it may be exponentially faster than simple classical algorithms. In the second part, we discuss interfering directed paths in disordered media. Important physical realizations are hopping conduction in semiconductors, spin glasses at high temperature, and granular D-wave superconductors. Sign order, defined as the directed path sum having greater probability of being positive than negative at large distance, is a characterization of the role of interference with implications for the response of systems to a magnetic field. We show that path sums are necessarily sign-

disordered in two dimensions but may be sign-ordered in three dimensions. Building on this result, we study the behavior of granular D-wave superconductors and show that the superconductivity is enhanced by a magnetic field, even beyond the directed-path regime.

Quantum Transverse Ising Spin-glass Model in the Mean Field [i. E. Field] Approximation Jun 11 2022
Introduction to Surface and Superlattice Excitations Nov 11 2019 Cottam and Tilley provide an introduction to the properties of wave-like excitations associated with surfaces and interfaces. The emphasis is on acoustic, optic and magnetic excitations, and apart from one section on liquid surfaces, the text concentrates on solids. The important topic of superlattices is also discussed, in which the different kind

Spin Dynamics May 10 2022 Spin Dynamics: Basics of Nuclear Magnetic Resonance, Second Edition is a comprehensive and modern introduction which focuses on those essential principles and concepts needed for a thorough understanding of the subject, rather than the practical aspects. The quantum theory of nuclear magnets is presented within a strong physical framework, supported by figures. The book assumes only a basic knowledge of complex numbers and matrices, and provides the reader with numerous worked examples and exercises to encourage understanding. With the explicit aim of carefully developing the subject from the beginning, the text starts with coverage of quarks and nucleons and progresses through to a detailed explanation of several important NMR experiments, including NMR imaging, COSY, NOESY and TROSY. Completely revised and updated, the Second Edition features new material on the properties and distributions of isotopes, chemical shift anisotropy and quadrupolar interactions, Pake patterns, spin echoes, slice selection in NMR imaging, and a complete new chapter on the NMR spectroscopy of quadrupolar nuclei. New appendices have been included on Euler angles, and coherence selection by field gradients. As in the first edition, all material is heavily supported by graphics, much of which is new to this edition. Written for undergraduates and postgraduate students taking a first course in NMR spectroscopy and for those needing an up-to-date account of the subject, this multi-disciplinary book will appeal to chemical, physical, material, life, medical, earth and environmental scientists. The detailed physical insights will also make the book of interest for experienced spectroscopists and NMR researchers. • An accessible and carefully written introduction, designed to help students to fully understand this complex and dynamic subject • Takes a multi-disciplinary approach, focusing on basic principles and concepts rather than the more practical aspects • Presents a strong pedagogical approach throughout, with emphasis placed on individual spins to aid understanding • Includes numerous worked examples, problems, further reading and additional notes Praise from the reviews of the First Edition: "This is an excellent book... that many teachers of NMR spectroscopy will cherish... It deserves to be a 'classic' among NMR spectroscopy texts." NMR IN BIOMEDICINE "I strongly recommend this book to everyone...it is probably the best modern comprehensive description of the subject." ANGEWANDTE CHEMIE, INTERNATIONAL EDITION

Handbook of Superconducting Materials Jan 14 2020

Interactions of Photons and Neutrons with Matter Nov 23 2020 This invaluable book is based on lecture notes developed for a one-semester graduate course entitled "Interaction of Radiation with Matter", taught in the Department of Nuclear Science and Engineering at the Massachusetts Institute of Technology. The main objective of the course is to teach enough quantum and classical radiation theory to allow students in engineering and the applied sciences to understand and have access to the vast literature on applications of ionizing and non-ionizing radiation in materials research. Besides presenting the fundamental physics of radiation interactions, the book devotes individual chapters to some of the important modern-day experimental tools, such as nuclear magnetic resonance, photon correlation spectroscopy, and the various types of neutron, x-ray, and light-scattering techniques. End-of-chapter problems have been added for the new edition, making the book more appropriate as a course textbook.

Frustrated Spin Systems Mar 08 2022 This book covers all principal aspects of currently investigated frustrated systems, from exactly solved frustrated models to real experimental frustrated systems, going

through renormalization group treatment, Monte Carlo investigation of frustrated classical Ising and vector spin models, low-dimensional systems, spin ice and quantum spin glass. The reader can OCo within a single book OCo obtain a global view of the current research development in the field of frustrated systems. This new edition is updated with recent theoretical, numerical and experimental developments in the field of frustrated spin systems. The first edition of the book appeared in 2005. In this edition, more recent works until 2012 are reviewed. It contains nine chapters written by researchers who have actively contributed to the field. Many results are from recent works of the authors. The book is intended for postgraduate students as well as researchers in statistical physics, magnetism, materials science and various domains where real systems can be described with the spin language. Explicit demonstrations of formulas and full arguments leading to important results are given where it is possible to do so."

Spin Waves in Layered Ising-model Systems in a Transverse Field Jan 18 2023

The Sherrington-Kirkpatrick Model Sep 02 2021 The celebrated Parisi solution of the Sherrington-Kirkpatrick model for spin glasses is one of the most important achievements in the field of disordered systems. Over the last three decades, through the efforts of theoretical physicists and mathematicians, the essential aspects of the Parisi solution were clarified and proved mathematically. The core ideas of the theory that emerged are the subject of this book, including the recent solution of the Parisi ultrametricity conjecture and a conceptually simple proof of the Parisi formula for the free energy. The treatment is self-contained and should be accessible to graduate students with a background in probability theory, with no prior knowledge of spin glasses. The methods involved in the analysis of the Sherrington-Kirkpatrick model also serve as a good illustration of such classical topics in probability as the Gaussian interpolation and concentration of measure, Poisson processes, and representation results for exchangeable arrays.

Physics of the Solid State Oct 11 2019

Quantum Ising Phases and Transitions in Transverse Ising Models Dec 17 2022 Quantum phase transitions, driven by quantum fluctuations, exhibit intriguing features offering the possibility of potentially new applications, e.g. in quantum information sciences. Major advances have been made in both theoretical and experimental investigations of the nature and behavior of quantum phases and transitions in cooperatively interacting many-body quantum systems. For modeling purposes, most of the current innovative and successful research in this field has been obtained by either directly or indirectly using the insights provided by quantum (or transverse field) Ising models because of the separability of the cooperative interaction from the tunable transverse field or tunneling term in the relevant Hamiltonian. Also, a number of condensed matter systems can be modeled accurately in this approach, hence granting the possibility to compare advanced models with actual experimental results. This work introduces these quantum Ising models and analyses them both theoretically and numerically in great detail. With its tutorial approach the book addresses above all young researchers who wish to enter the field and are in search of a suitable and self-contained text, yet it will also serve as a valuable reference work for all active researchers in this area.

Parity And Time Reversal Violation In Compound Nuclear States And Related Topics: Proceedings Of The International Aug 01 2021 The book contains the Proceedings of the 2010 Conference of the Italian Systems Society. Papers deal with the interdisciplinary study of processes of changing related to a wide variety of specific disciplinary aspects. Classical attempts to deal with them, based on generalising approaches used to study the movement of bodies and environmental influence, have included ineffective reductionistic simplifications. Indeed changing also relates, for instance, to processes of acquisition and varying properties such as for software; growing and aging biological systems; learning/cognitive systems; and socio-economic systems growing and developing through innovations. Some approaches to modelling such processes are based on considering changes in structure, e.g., phase-transitions. Other approaches are based on considering (1) periodic changes in structure as for processes of self-organisation; (2) non-periodic but coherent changes in structure, as for processes of emergence; (3) the quantum level of description. Papers in

the book study the problem considering its transdisciplinary nature, i.e., systemic properties studied per se and not within specific disciplinary contexts. The aim of these studies is to outline a transdisciplinary theory of change in systemic properties. Such a theory should have simultaneous, corresponding and eventually hierarchical disciplinary aspects as expected for a general theory of emergence. Within this transdisciplinary context, specific disciplinary research activities and results are assumed to be mutually represented as within a philosophical and conceptual framework based on the theoretical centrality of the observer and conceptual non-separability of context and observer, related to logically open systems and Quantum Entanglement. Contributions deal with such issues in interdisciplinary ways considering theoretical aspects and applications from Physics, Cognitive Science, Biology, Artificial Intelligence, Economics, Architecture, Philosophy, Music and Social Systems.

Dynamics of the Ising Model in a Transverse Field Dec 05 2021

Exact Solution to Spin Squeezing of the Arbitrary-Range Spin Interaction and Transverse Field

*Model*Supported by the National Natural Science Foundation of China Under Grant Sep 14 2022 Abstract*
: We investigate spin squeezing effects of trapped ions in an off-resonance optical potential system using the arbitrary range spin—spin interaction and transverse field model. The collective spin noises at any time are analyzed exactly. The general expression of spin squeezing factor is presented for arbitrary-range spin interaction. For the nearest-neighbor and next-nearest neighbor spin interaction model, the analytic solutions are reduced from the general expressions. It is shown that the maximum spin squeezing is enhanced for the general arbitrary-range spin interaction compared with the nearest-neighbor interaction model as the long-range interaction with arbitrary sites enforces stronger correlation.

Spin 2004 Nov 04 2021 This comprehensive volume covers the most recent advances in the field of spin physics, including the latest research in high energy and nuclear physics and the study of nuclear spin structure. The comprehensive coverage also includes polarized proton and electron acceleration and storage as well as polarized ion sources and targets. Many significant new results and achievements on the different topics considered at the symposium are presented in this book for the first time. Contents: Present Understanding of the Nucleon Spin Structure (A Metz)Understanding Transversity: Present and Future (V Barone)Results and Future Prospects for Muon ($g - 2$) (B L Roberts)First Results from RHIC Spin Program and Future Prospects (N Saito)Speculations in Hadron Spectroscopy (J M Richard)Nucleon Form Factors (K de Jager)Experimental Status of the GDH Sum Rule (H Arends)Polarized Structure Functions with Neutrino Beams (S Forte)Higher Twists Resummation in Inclusive and Semi-Inclusive Spin-Dependent DIS (O V Teryaev)A New Angular Momentum Sum Rule (E Leader)Single Spin Asymmetry Measurements for π^0 Inclusive Productions in $p + p \uparrow \rightarrow \pi^0 + X$ and $\pi^- + p \uparrow \rightarrow \pi^0 + X$ Reactions at 70 and 40 GeV Respectively (S B Nurushev)Polarisation in the eRHIC Electron (Positron) Ring (D P Barber)Polarisation Build Up in COMPASS 6LiD Target (J Koivuniemi)and other papers (a total of 170 contributions) Readership: Researchers and graduate students in spin physics, including experimental, theoretical and accelerator physics. Keywords:Spin;Fundamental Symmetries;QCD;Nuclear Physics;Hadronic Physics;Polarized Targets;Polarized Beams;PolarimetryKey Features:

Encyclopedia of Spectroscopy and Spectrometry Feb 13 2020 This third edition of the Encyclopedia of Spectroscopy and Spectrometry provides authoritative and comprehensive coverage of all aspects of spectroscopy and closely related subjects that use the same fundamental principles, including mass spectrometry, imaging techniques and applications. It includes the history, theoretical background, details of instrumentation and technology, and current applications of the key areas of spectroscopy. The new edition will include over 80 new articles across the field. These will complement those from the previous edition, which have been brought up-to-date to reflect the latest trends in the field. Coverage in the third edition includes: Atomic spectroscopy Electronic spectroscopy Fundamentals in spectroscopy High-Energy spectroscopy Magnetic resonance Mass spectrometry Spatially-resolved spectroscopic analysis Vibrational,

rotational and Raman spectroscopies The new edition is aimed at professional scientists seeking to familiarize themselves with particular topics quickly and easily. This major reference work continues to be clear and accessible and focus on the fundamental principles, techniques and applications of spectroscopy and spectrometry. Incorporates more than 150 color figures, 5,000 references, and 300 articles for a thorough examination of the field Highlights new research and promotes innovation in applied areas ranging from food science and forensics to biomedicine and health Presents a one-stop resource for quick access to answers and an in-depth examination of topics in the spectroscopy and spectrometry arenas

Applications + Practical Conceptualization + Mathematics = fruitful Innovation Feb 07 2022 This book is a collection of papers presented at the conference "Forum Math-for-Industry 2014" for which the unifying theme was "Applications + Practical Conceptualization + Mathematics = fruitful Innovation" in October 2014. This epigram encapsulates the dynamics of the process that takes an application through to an innovation. Industrial mathematics can be viewed as the causal engine that implements the epigram by taking an Application such as input and convolving it with a mixture of Practical Conceptualization and Mathematics to generate a fruitful Innovation as output. The book illustrates various aspects of the two-way interaction between applications and their association highlighting how practical conceptualization assists with the linking of the question that encapsulates the current application to the relevant mathematics. The contents of this volume address productive and successful interaction between industry and mathematicians, as well as the cross-fertilization and collaboration that result when mathematics is involved with the advancement of science and technology.

Computer Simulation Studies in Condensed-Matter Physics X Dec 25 2020 *Computer Simulation Studies in Condensed-Matter Physics X* is devoted to Prof. Masuo Suzuki's ideas, which have made novel, new simulations possible. These proceedings, of the 1997 workshop, comprise three parts that deal with new algorithms, methods of analysis, and conceptual developments. The first part contains invited papers that deal with simulational studies of classical systems. The second of the proceedings is devoted to invited papers on quantum systems, including new results for strongly correlated electron and quantum spin models. The final part contains a large number of contributed presentations.

Order, Disorder and Criticality Dec 13 2019 This book reviews some of the classic aspects in the theory of phase transitions and critical phenomena, which has a long history. Recently, these aspects are attracting much attention due to essential new contributions. The topics presented in this book include : mathematical theory of the Ising model; equilibrium and non-equilibrium criticality of one-dimensional quantum spin chains; influence of structural disorder on the critical behaviour of the Potts model; criticality, fractality and multifractality of linked polymers; field-theoretical approaches in the super conducting phase transitions. The book is based on the review lectures that were given in Lviv (Ukraine) in March 2002 at the "Ising lectures" - a traditional annual workshop on phase transitions and critical phenomena which aims to bring together scientists working in the field of phase transitions with university students and those who are interested in the subject.

Fiscal year 1985 Department of Energy authorization Aug 21 2020

Theoretical Studies of Frustrated Magnets with Dipolar Interactions Jul 12 2022 Several magnetic materials, in the first approximation, can be described by idealised theoretical models, such as classical Ising or Heisenberg spin systems, and, to some extent, such models are able to qualitatively expose many experimentally observed phenomena. But often, to account for complex behavior of magnetic matter, such models have to be refined by including more terms in Hamiltonian. The compound $\text{LiHo}_x\text{Y}_{1-x}\text{F}_4$, by increasing concentration of nonmagnetic yttrium can be tuned from a diluted ferromagnet to a spin glass. LiHoF_4 is a good realisation of the transverse field Ising model, the simplest model exhibiting a quantum phase transition. In the pure case the magnetic behaviour of this material is well described by mean-field theory. It was believed that when diluted, $\text{LiHo}_x\text{Y}_{1-x}\text{F}_4$

would also manifest itself as a diluted transverse field Ising model which continue to be well described by mean-field theory, and, at sufficient dilution, at zero temperature, exhibit a quantum spin-glass transition. The experimental data did not support such a scenario, and it was pointed out that, to explain physics of LiHoF_4 in transverse magnetic field, the effect of a transverse-field-generated longitudinal random field has to be considered. We explore this idea further in local mean-field studies in which all three parameters: temperature, transverse field and concentration can be consistently surveyed, and where the transverse-field-generated longitudinal random field is explicitly present in the effective spin-1/2 Hamiltonian. We suggest other materials that are possible candidates for studying quantum criticality in the transverse field Ising model, and in the diluted case, for studying the effects of transverse and longitudinal random fields. The compounds we consider are $\text{RE}(\text{OH})_3$, where RE are the rare earth ions Tb, Dy and Ho. Using mean-field theory, we estimate the values of the transverse magnetic field that, at zero temperature, destroy ferromagnetic order to be $B_c = 4.35$ T, $B_c = 5.03$ T and $B_c = 54.81$ T for $\text{Ho}(\text{OH})_3$, $\text{Dy}(\text{OH})_3$ and $\text{Tb}(\text{OH})_3$, respectively. We confirm that $\text{Ho}(\text{OH})_3$ and $\text{Tb}(\text{OH})_3$, similarly to LiHoF_4 , can be described by an effective spin-1/2 Hamiltonian. In the case of $\text{Dy}(\text{OH})_3$ there is a possibility of a first order phase transition at transverse field close to B_c , and $\text{Dy}(\text{OH})_3$ cannot be described by a spin-1/2 effective Hamiltonian.

Quantum Phase Transitions in Transverse Field Spin Models Nov 16 2022 The transverse field Ising and XY models (the simplest quantum spin models) provide the organising principle for the rich variety of interconnected subjects which are covered in this book. From a generic introduction to in-depth discussions of the subtleties of the transverse field Ising and related models, it includes the essentials of quantum dynamics and quantum information. A wide range of relevant topics has also been provided: quantum phase transitions, various measures of quantum information, the effects of disorder and frustration, quenching dynamics and the Kibble–Zurek scaling relation, the Kitaev model, topological phases of quantum systems, and bosonisation. In addition, it also discusses the experimental studies of transverse field models (including the first experimental realisation of quantum annealing) and the recent realisation of the transverse field Ising model using tunable Josephson junctions. Further, it points to the obstacles still remaining to develop a successful quantum computer.

Muon Spin Rotation, Relaxation, and Resonance Jun 18 2020 Primarily intended for postgraduate students and researchers in the fields of condensed matter science, chemical physics and material science, who plan to use the muon spin rotation, relaxation and resonance (μSR) techniques, this book combines for the first time a detailed discussion of the physical information contained in the measured polarisation functions with real-life examples taken from the literature. It is divided in three main parts. The first part presents some typical results of the application of μSR and explains the basic principles involved. The second part is the core of this book. It presents a comprehensive discussion of the measured polarisation functions. In the third part we analyse in four chapters selected examples taken from the following fields: diffusion properties of muon and muonium, magnetism, superconductivity, and muonium centres in materials. The book is completed by an epilogue and eight appendices.

An Introduction to Quantum Spin Systems Jul 20 2020 The topic of lattice quantum spin systems is a fascinating and by now well established branch of theoretical physics. Based on a set of lectures, this book has a level of detail missing from others, and guides the reader through the fundamentals of the field.

Spin - 1/2 Isotropic XY Chain with Dzyaloshynskii-moriya Interaction in Random Lorentzian Transverse Field Oct 03 2021

Conductor Insulator Quantum Phase Transitions Jan 26 2021 When many particles come together how do they organize themselves? And what destroys this organization? Combining experiments and theory, this book describes intriguing quantum phases - metals, superconductors and insulators - and transitions between

them. It captures the excitement and the controversies on topics at the forefront of research.

Lampf Users Group Inc. (Lugi) Symposium: 20 Years Of Meson Factory Physics: Accomplishments And Prosp Jun 30 2021 This book reviews the major physics results from the meson factories, surveys the status of the relevant fields (including pion physics, hadron physics, and electroweak physics), and explores prospects for further progress.

Advances in Chemical Physics Apr 16 2020 This is the only series of volumes available that represents the cutting edge of research relative to advances in chemical physics. Provides the chemical physics field with a forum for critical, authoritative evaluations of advances in every area of the discipline. Continues to report recent advances with significant, up-to-date chapters. Contributing authors are internationally recognized researchers.

Quantum Phase Transitions Apr 09 2022 Describing the physical properties of quantum materials near critical points with long-range many-body quantum entanglement, this book introduces readers to the basic theory of quantum phases, their phase transitions and their observable properties. This second edition begins with a new section suitable for an introductory course on quantum phase transitions, assuming no prior knowledge of quantum field theory. It also contains several new chapters to cover important recent advances, such as the Fermi gas near unitarity, Dirac fermions, Fermi liquids and their phase transitions, quantum magnetism, and solvable models obtained from string theory. After introducing the basic theory, it moves on to a detailed description of the canonical quantum-critical phase diagram at non-zero temperatures. Finally, a variety of more complex models are explored. This book is ideal for graduate students and researchers in condensed matter physics and particle and string theory.

Quantum Phase Transitions in Transverse Field Models Feb 19 2023 This book establishes the fundamental connections between the physics of quantum phase transitions and the technological promise of quantum information.

Quantum Spin Glasses, Annealing and Computation Aug 13 2022 "Discusses the recent developments in quantum statistical physics of spin glasses and quantum computations"--Provided by publisher.

Spin Glasses and Other Frustrated Systems Mar 16 2020 The long list of "spin glass materials" and the summary of the experimental results provided in this book emphasize the common features of spin glasses despite the diversities. The critical review of more than a thousand papers not only identifies the complexities involved in the theoretical understanding of the static and dynamic properties of real spin glasses but also explains the physical concepts and mathematical formalism which have been used so successfully in solving the infinite range model. Moreover, a beginner will find practical applications of the concepts of broken ergodicity, ultrametricity, gauge invariance, etc. in this book. Major progress has been made in solving many other challenging problems, e.g., computer design, associative memory, pattern recognition and neural networks, evolution of biological species etc. by mapping them onto the spin glass models. The chapter on these spin-glass-like systems will be useful not only to physicists but also to computer scientists and biologists.
Contents:Real Spin Glass Materials, Spin-Glass-Like Systems and Spin Glass ModelsMean Field Theory of Spin GlassesSherrington-Kirkpatrick (SK) ModelVarious Solutions of the SK Model and Their EquivalenceDynamics of Spin GlassesVector Spin Glasses and Mixed PhaseResults of Computer ExperimentsRandom Energy Model
Readership: Condensed matter physicists and material scientists.
Keywords:Spin Glass Materials;Ergodicity;Ultrametricity;Gauge Invariance;Sherrington-Kirkpatrick (SK) Model;Random Energy Model

The Spin Structure Of The Nucleon Apr 28 2021 From its early beginnings at SLAC in the 1970's, the study of nucleon spin structure using polarized lepton beams and polarized nucleon targets has become increasingly important in nuclear and particle physics, with current experiments at several of the world's high energy and nuclear physics laboratories (CERN, DESY, SLAC and Jefferson Lab) and with enormous related theoretical studies. The understanding of the fascinating but complicated problem of nucleon spin

structure has progressed substantially, but fundamental questions remain and it can be confidently predicted that future activity will be high. The Erice Course on The Spin Structure of the Nucleon covered both the experimental and theoretical aspects of the subject, and this volume includes the lectures given at the School. In many cases the lecture material has been extended and updated by the authors. In addition, several recent publications on experimental work have been added in an appendix.

Zero-field Spin Relaxation of the Positive Muon in Copper May 18 2020 The spin relaxation of the μ^+ in high purity single crystal and polycrystalline copper has been measured at temperatures between 0.5°K and 5.2°K by the zero-field μ^+ SR technique. In both types of sample the experiments show a temperature independent dipolar width $\Delta z = 0.389 \pm 0.003 \mu\text{s}^{-1}$ and a hopping rate decreasing from approx. 0.5 μs^{-1} at 0.5°K to approx. 0.05 μs^{-1} above 5°K. This is the first direct proof of a dynamic effect in the low temperature μ^+ spin relaxation in copper. The relationship between the zero-field and transverse-field dipolar widths is discussed, and the measured zero-field width is found to be approx. 10% larger than expected based on the known transverse-field widths. A new μ^+ SR spectrometer has been constructed and used in this work. The spectrometer and the associated beam lines and data acquisition facilities are discussed.

Quantum Transverse Ising Spin-Glass Model in the Mean Field Approximation Oct 15 2022

Parallel Algorithms and Cluster Computing Sep 21 2020 This book presents advances in high performance computing as well as advances accomplished using high performance computing. It contains a collection of papers presenting results achieved in the collaboration of scientists from computer science, mathematics, physics, and mechanical engineering. From science problems to mathematical algorithms and on to the effective implementation of these algorithms on massively parallel and cluster computers, the book presents state-of-the-art methods and technology, and exemplary results in these fields.

Transverse Spin Physics Jan 06 2022 This study deals with the theory and phenomenology of transverse spin effects in high-energy hadronic physics. Contrary to common past belief, it is now rather clear that these effects are far from irrelevant. A decade or so of intense theoretical work has shed much light on the subject and brought to the surface an entire class of new phenomena, which now await thorough experimental investigation. Over the next few years a number of experiments worldwide (at DESY, CERN and Brookhaven) will run with transversely polarised particles, providing data that will enrich our knowledge of the transverse spin structure of hadrons. The principle aim of this work is to assess the state of the art as it stands in 2002. After a few introductory remarks (Chapter 1), in the first part (Chapters 2-4) attention is directed to polarised deep inelastic scattering (DIS), particularly DIS on transversely polarised targets, which probes the transverse spin structure function g_2 . This structure function is examined within the framework of the quark-parton model and its improvement via perturbative QCD. The existing data are reviewed and commented on (for completeness and comparison, a brief presentation of longitudinally polarised DIS and of the helicity structure of the proton is provided). The second part of the book (Chapters 5-8) focuses on the transverse polarisation of quarks, the so-called "transversity". The partonic content and the QCD evolution of the transversity distributions are presented in detail. The phenomenology of transversity is then studied in the context of Drell-Yan processes and of semi-inclusive lepto- and hadroproduction. The interpretation of data on single-spin asymmetries is discussed and, finally, the prospects for future measurements are reviewed.

Superconductivity Feb 24 2021 Superconductivity is among the most exciting of quantum phenomena in condensed matter physics, and has important applications across science and technology, from fusion reactors to particle accelerators. This self-contained text provides a comprehensive account of the physical foundations of superconductivity and related recent developments in the field. Beginning with a detailed description of the BCS theory of superconductivity, the book then describes the subsequent successes of this landmark theory and proceeds to more advanced topics such as Josephson effects and vortices. The strong

coupling theory of superconductivity is introduced in later chapters, providing a springboard to important current research on hydride superconductors, which have displayed very high critical temperatures. Recent manifestations of superfluidity in ultracold atoms physics are also described. This book will give readers a solid grounding in the theory and applications of superconductivity, and an appreciation of its broader importance in the field of modern condensed matter physics.

- [Quantum Phase Transitions In Transverse Field Models](#)
- [Spin Waves In Layered Ising model Systems In A Transverse Field](#)
- [Quantum Ising Phases And Transitions In Transverse Ising Models](#)
- [Quantum Phase Transitions In Transverse Field Spin Models](#)
- [Quantum Transverse Ising Spin Glass Model In The Mean Field Approximation](#)
- [Exact Solution To Spin Squeezing Of The Arbitrary Range Spin Interaction And Transverse Field Model Supported By The National Natural Science Foundation Of China Under Grant](#)
- [Quantum Spin Glasses Annealing And Computation](#)
- [Theoretical Studies Of Frustrated Magnets With Dipolar Interactions](#)
- [Quantum Transverse Ising Spin glass Model In The Mean Field I E Field Approximation](#)
- [Spin Dynamics](#)
- [Quantum Phase Transitions](#)
- [Frustrated Spin Systems](#)
- [Applications Practical Conceptualization Mathematics Fruitful Innovation](#)
- [Transverse Spin Physics](#)
- [Dynamics Of The Ising Model In A Transverse Field](#)
- [Spin 2004](#)
- [Spin 1 2 Isotropic XY Chain With Dzyaloshynskii moriya Interaction In Random Lorentzian Transverse Field](#)
- [The Sherrington Kirkpatrick Model](#)
- [Parity And Time Reversal Violation In Compound Nuclear States And Related Topics Proceedings Of The International](#)
- [Lampf Users Group Inc Lugi Symposium 20 Years Of Meson Factory Physics Accomplishments And Prosp](#)
- [Muon And Muonium Chemistry](#)
- [The Spin Structure Of The Nucleon](#)
- [Quantum Dynamics In Rugged Energy Landscapes And Additional Topics In Disordered Systems](#)
- [Superconductivity](#)
- [Conductor Insulator Quantum Phase Transitions](#)
- [Computer Simulation Studies In Condensed Matter Physics X](#)
- [Interactions Of Photons And Neutrons With Matter](#)
- [EPR Of Free Radicals In Solids](#)
- [Parallel Algorithms And Cluster Computing](#)
- [Fiscal Year 1985 Department Of Energy Authorization](#)

- [*An Introduction To Quantum Spin Systems*](#)
- [*Muon Spin Rotation Relaxation And Resonance*](#)
- [*Zero field Spin Relaxation Of The Positive Muon In Copper*](#)
- [*Advances In Chemical Physics*](#)
- [*Spin Glasses And Other Frustrated Systems*](#)
- [*Encyclopedia Of Spectroscopy And Spectrometry*](#)
- [*Handbook Of Superconducting Materials*](#)
- [*Order Disorder And Criticality*](#)
- [*Introduction To Surface And Superlattice Excitations*](#)
- [*Physics Of The Solid State*](#)