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Transport Phenomena in Strongly Correlated Fermi Liquids Springer In conventional metals, various transport coefficients are scaled according to the quasiparticle relaxation time, \tau, which implies that the relaxation time approximation (RTA) holds well. However, such a simple scaling does not hold in many strongly correlated electron systems, reflecting their unique electronic states. The most famous example would be cuprate high-Tc superconductors (HTSCs), where almost all the transport coefficients exhibit a significant deviation from the RTA results. To better understand the origin of this discrepancy, we develop a method for calculating various transport coefficients beyond the RTA by employing field theoretical techniques. Near the magnetic quantum critical point, the current vertex correction (CVC), which describes the electron-electron scattering beyond the relaxation time approximation, gives rise to various anomalous transport phenomena. We explain anomalous transport phenomena in cuprate HTSCs and other metals near their magnetic or orbital quantum critical point using a uniform approach. We also discuss spin related transport phenomena in strongly correlated systems. In many d- and f-electron systems, the spin current induced by the spin Hall effect is considerably greater because of the orbital degrees of freedom. This fact attracts much attention due to its potential application in spintronics. We discuss various novel charge, spin and heat transport phenomena in strongly correlated metals. **Transport Phenomena in Strongly Correlated Fermi Liquids** In conventional metals, various transport coefficients are scaled according to the quasiparticle relaxation time, \tau, which implies that the relaxation time approximation (RTA) holds well. However, such a simple scaling does not hold in many strongly correlated electron systems, reflecting their unique electronic states. The most famous example would be cuprate high-Tc superconductors (HTSCs),

where almost all the transport coefficients exhibit a significant deviation from the RTA results. To better understand the origin of this discrepancy, we develop a method for calculating various transport coefficients beyond the RTA by employing field theoretical techniques. Near the magnetic quantum critical point, the current vertex correction (CVC), which describes the electron-electron scattering beyond the relaxation time approximation, gives rise to various anomalous transport phenomena. We explain anomalous transport phenomena in cuprate HTSCs and other metals near their magnetic or orbital quantum critical point using a uniform approach. We also discuss spin related transport phenomena in strongly correlated systems. In many d- and f-electron systems, the spin current induced by the spin Hall effect is considerably greater because of the orbital degrees of freedom. This fact attracts much attention due to its potential application in spintronics. We discuss various novel charge, spin and heat transport phenomena in strongly correlated metals. **Thermal Transport in Strongly Correlated Rare-Earth Intermetallic Compounds Springer** This thesis explores thermal transport in selected rare-earth-based intermetallic compounds to answer questions of great current interest. It also sheds light on the interplay of Kondo physics and Fermi surface changes. By performing thermal conductivity and electrical resistivity measurements at temperatures as low as 25mK, the author demonstrates that the Wiedemann–Franz law, a cornerstone of metal physics, is violated at precisely the magnetic-field-induced quantum critical point of the heavy-fermion metal YbRh2Si2. This first-ever observation of a violation has dramatic consequences, as it implies a breakdown of the quasiparticle picture. Utilizing an innovative technique to measure low-temperature thermal transport isothermally as a function of the magnetic field, the thesis interprets specific, partly newly discovered, high-field transitions in CeRu2Si2 and YbRh2Si2 as Lifshitz transitions related to a change in the Fermi surface. Lastly, by applying this new technique to thermal conductivity measurements of the skutterudite superconductor LaPt4Ge12, the thesis proves that the system is a conventional superconductor with a single energy gap. Thus, it refutes the widespread speculations about unconventional Cooper pairing in this material. **Proceedings of Physical Phenomena at High Magnetic Fields-IV Santa Fe, New Mexico, USA, 19-25 October 2001 World Scientific** Physical Phenomena at High Magnetic Fields IV (PPHMF-IV) was the fourth in the series of conferences sponsored by the National High Magnetic Field Laboratory (NHMFL). The success of PPHMF-I, II and III, held in 1991, 1995 and 1998 respectively, encouraged the organizers to once again bring together experts in scientific research areas where high magnetic fields play an important role, to critically assess the current status of research in these areas, and to discuss promising new directions in science, as well as applications which are in the forefront of these fields. **Lectures on the Physics of Highly Correlated Electron Systems VI Training Course in the Physics of Correlated Electron Systems and High-Tc Superconductors, Salerno, Italy, 8-19 October 2001 American Inst. of Physics** This volume contains the lectures and participant contributions delivered at the Sixth Training Course in the Physics of Correlated Electron Systems and High-Tc Superconductors. Different from usual workshops, this course was designed to promote active participation of senior and young researchers and to introduce them to some specific problems. Lecture topics

include: Introduction to Renormalization Group and Ward Identities in Critical Phenomena and in Fermi and Bose Liquids; Local Moment Physics in Heavy Electron Systems; and Transport of Strongly Correlated Electrons. Other contributions include: Theoretical de Haas-van Alphen Data and Plasma Frequencies of MgB2 and TaB2; Magnetic and Orbital Ordering in Doped Manganites; A Combined Exact Diagonalization - ab initio Study of the Metallicity and Electron Localization in Nanoscopic Systems; A New Spinwave Expansion for the Ordered Kondo Lattice; and The Novel Superconducting Clathrates. **Electron Correlation in Metals Cambridge University Press** Since the discovery of high Tc superconductivity, the role of electron correlation on superconductivity has been an important issue in condensed matter physics. Here the role of electron correlation in metals is explained in detail on the basis of the Fermi liquid theory. The book, originally published in 2004, discusses the following issues: enhancements of electronic specific heat and magnetic susceptibility, effects of electron correlation on transport phenomena such as electric resistivity and Hall coefficient, magnetism, Mott transition and unconventional superconductivity. These originate commonly from the Coulomb repulsion between electrons. In particular, superconductivity in strongly correlated electron systems is discussed with a unified point of view. This book is written to explain interesting physics in metals for undergraduate and graduate students and researchers in condensed matter physics. **Quantum Phenomena in Mesoscopic Systems IOS Press** This book is a snapshot of the vision shared by outstanding scientists on the key theoretical and experimental issues in Mesoscopic Physics. Quantum properties of electrons in solid state devices and transport in semiconducting and superconducting low-dimensional systems, are discussed, as well as the basis of quantum computing (entanglement, noise decoherence and read-out). Each chapter collects the material presented at a Varenna School course of last year, by leading experts in the field. The reader gets a flavor, how theorists and experimentalists are paving the way to the physical realization of solid state qubits, the basic units of the new logic and memory elements for quantum processing. He will be surprised in finding that mesoscopic solid state devices, which were invented just yesterday (think of the Single Electron Transistor, or the Cooper Pair Box) are currently used as charge-sensing applications in the equipment of frontier research laboratories. These devices contribute as probing systems to produce evidence on still unsettled questions in topics like the metal-insulator transition in disordered two dimensional systems, quantum Hall conductance in heterostructures, or Kondo conductance in quantum dots. **Transport in Multilayered Nanostructures The Dynamical Mean-Field Theory Approach Strongly Correlated Fermi Systems A New State of Matter Springer Nature** This book focuses on the topological fermion condensation quantum phase transition (FCQPT), a phenomenon that reveals the complex behavior of all strongly correlated Fermi systems, such as heavy fermion metals, quantum spin liquids, quasicrystals, and two-dimensional systems, considering these as a new state of matter. The book combines theoretical evaluations with arguments based on experimental grounds demonstrating that the entirety of very different strongly correlated Fermi systems demonstrates a universal behavior induced by FCQPT. In contrast to the conventional quantum phase transition, whose physics in the quantum critical region are

dominated by thermal or quantum fluctuations and characterized by the absence of quasiparticles, the physics of a Fermi system near FCQPT are controlled by a system of quasiparticles resembling the Landau quasiparticles. The book discusses the modification of strongly correlated systems under the action of FCQPT, representing the “missing” instability, which paves the way for developing an entirely new approach to condensed matter theory; and presents this physics as a new method for studying many-body objects. Based on the authors’ own theoretical investigations, as well as salient theoretical and experimental studies conducted by others, the book is well suited for both students and researchers in the field of condensed matter physics. **Strong Correlation and Superconductivity Proceedings of the IBM Japan International Symposium, Mt. Fuji, Japan, 21–25 May, 1989 Springer Science & Business Media** This volume contains the proceedings of the ffiM Japan International Sympo sium on Strong Correlation and Superconductivity, which was held in Keidan ren Guest House at the foot of Mt. Fuji, May 21-25, 1989. The purpose of the Symposium was to provide an opportunity for discus sions on the problem of strong correlation of electrons in the context of high-Tc superconductivity. Sixty-eight scientists were invited from seven countries and forty-three papers were presented in the Symposium. Soon after the discovery ofhigh-Tc superconducting oxides, Professor P. W. Anderson proposed that the essence of high-Tc superconductivity lies in the strong correlation among the electrons in these materials. This proposal has stimulated a wide range of theoretical investigations on this profound and dif ficult problem, which are expected to lead eventually to new concepts describ ing strong electron correlation. In the Symposium, Anderson himself started lively discussions by his talk entitled "Myth and Reality in High-Tc Supercon ductivity", which was followed by various reports on theoretical studies and experimental results. Concise and thoughtful summaries of experiment and theory were given by Professors H. R. Ott and P. A. Lee, respectively. It is our hope that this volume reflects the present status of the research activity on this outstanding problem from the viewpoint of the basic physics and that it will further stimulate the effort to understand these fascinating systems, the high-Tc oxides. **Journal of the Physical Society of Japan Spectroscopy of Mott Insulators and Correlated Metals Proceedings of the 17th Taniguchi Symposium, Kashikojima, Japan, October 24-28, 1994 Springer Science & Business Media** Spectroscopy of Mott Insulators and Correlated Metals Extensive studies of high-Tc cuprate superconductors have stimualted investigations into various transition-metal oxides. Mott transitions in particular provide fascinating problems and new concepts in condensed matter physics. This book is a collection of short overviews by well-known, active researchers in this field. It deals with the latest developments, with particular emphasis on the theoretical, spectroscopic, and transport aspects. **Realizing Controllable Quantum States Spin Orbitronics And Topological Properties Of Nanostructures - Lecture Notes Of The Twelfth International School On Theoretical Physics World Scientific** This volume presents lecture notes of the 12th International School of Theoretical Physics held in 2016 in Rzeszów, Poland. The lectures serve as an introduction for young physicists starting their career in condensed matter theoretical physics. The book provides a comprehensive overview of modern ideas and advances in theories and

experiments of new materials, quantum nanostructures as well as new mathematical methods.This lecture note is an essential source of reference for physicists and materials scientists. It is also a suitable reading for graduate students. **Advances in Superconductivity XII Proceedings of the 12th International Symposium on Superconductivity (ISS '99), October 17–19, 1999, Morioka Springer Science & Business Media** The 12th International Symposium on Superconductivity was held in Morioka, Japan, October 17-19, 1999. Convened annually since 1988, the symposium covers the whole field of superconductivity from fundamental physics and chemistry to a variety of applications. At the 12th Symposium, a mini-symposium focusing on the two-dimensionality of high-temperature superconductors, or the c-axis transport, and a session on vortex physics were organized. There were also many reports on the recent developments of YBCO-based coated conductors both in the United States and in Japan, AC losses of wires and tapes, developments of bulk materials with strong flux pinning, the recent progress in thin film and junction technologies, and the demonstration of various electronics applications using SQUIDs, microwave devices, and single-flux-quantum (SFQ) digital devices. This volume is a valuable resource for all those working in the field of superconductivity. **Neutron Scattering Lectures of the JCNS Laboratory Course Held at Forschungszentrum Jülich and the Research Reactor FRM II of TU Munich Forschungszentrum Jülich Activity Report Recent Progress in Many-Body Theories Volume 4 Springer Science & Business Media** The present volume contains the text of the invited talks delivered at the Eighth International Conference on Recent Progress in Many-Body Theories held at SchloB Seggau, Province of Styria, Austria, during the period August 22-26, 1994. The pro ceedings of the Fifth Conference (Oulu, Finland 1987), the Sixth Conference (Arad, Israel 1989) and the Seventh Conference (Minneapolis, USA 1991) have been published. by Plenum as the first three volumes of this series. Papers from the First Conference (Trieste, Italy 1978) comprise Nuclear Physics volume A328, Nos. 1 and 2, the Second Conference (Oaxtepec, Mexico 1979) was published by Springer-Verlag as volume 142 of "Lecture Notes in Physics," entitled "Recent Progress in Many Body Theories." Vol ume 198 of the same series contains the papers from the Third Conference (Altenberg, 1983). These volumes intend to cover a broad spectrum of current research topics in physics that benefit from the application of many-body theories for their elucidation. At the same time there is a focus on the development and refinement of many-body methods. One of the major aims of the conference series has been to foster the exchange of ideas among physicists working in such diverse areas as nuclear physics, quantum chemistry, complex systems, lattice Hamiltonians, quantum fluids and condensed matter physics. The present volume contains contributions from all these areas. th The conference was dedicated on the occasion of Ludwig Boltzmann's 150 birthday. **Open Problems in Strongly Correlated Electron Systems Springer Science & Business Media** Proceedings of the NATO Advanced Research Workshop, Bled, Slovenia, 26-30 April 2000 **Two-Dimensional Electron Systems on Helium and other Cryogenic Substrates Springer Science & Business Media** Recent studies on two-dimensional systems have led to new insights into the fascinating interplay between physical properties and dimensionality. Many of these ideas have emerged from

work on electrons bound to the surface of a weakly polarizable substrate such as liquid helium or solid hydrogen. The research on this subject continues to be at the forefront of modern condensed matter physics because of its fundamental simplicity as well as its connection to technologically useful devices. This book is the first comprehensive overview of experimental and theoretical research in this exciting field. It is intended to provide a coherent introduction for graduate students and non-experts, while at the same time serving as a reference source for active researchers in the field. The chapters are written by individuals who made significant contributions and cover a variety of specialized topics. These include the origin of the surface states, tunneling and magneto-tunneling out of these states, the phase diagram, collective excitations, transport and magneto-transport. **Quantum Many-Body Physics in Open Systems: Measurement and Strong Correlations Springer Nature** This book studies the fundamental aspects of many-body physics in quantum systems open to an external world. Recent remarkable developments in the observation and manipulation of quantum matter at the single-quantum level point to a new research area of open many-body systems, where interactions with an external observer and the environment play a major role. The first part of the book elucidates the influence of measurement backaction from an external observer, revealing new types of quantum critical phenomena and out-of-equilibrium dynamics beyond the conventional paradigm of closed systems. In turn, the second part develops a powerful theoretical approach to study the in- and out-of-equilibrium physics of an open quantum system strongly correlated with an external environment, where the entanglement between the system and the environment plays an essential role. The results obtained here offer essential theoretical results for understanding the many-body physics of quantum systems open to an external world, and can be applied to experimental systems in atomic, molecular and optical physics, quantum information science and condensed matter physics. **High-Tc Superconductivity 1996 Ten Years after the Discovery Springer Science & Business Media** After an introduction by J.G. Bednorz, describing the discovery of high Tc superconductivity and its consequences, the book goes on to describe modern research, dealing with general problems, new materials and structures, phase separation, electronic homogeneities and related problems, and applications. Specific systems dealt with include the La-cuprates. the Bi-cuprates and the Y-cuprates and related compounds. **Solid-State Physics An Introduction to Principles of Materials Science Springer Science & Business Media** This new edition of the well-received introduction to solid-state physics provides a comprehensive overview of the basic theoretical and experimental concepts of materials science. Experimental aspects and laboratory details are highlighted in separate panels that enrich text and emphasize recent developments. Notably, new material in the third edition includes sections on important new devices, aspects of non- periodic structures of matter, phase transitions, defects, superconductors and nanostructures. Students will benefit significantly from solving the exercises given at the end of each chapter. This book is intended for university students in physics, materials science and electrical engineering. It has been thoroughly updated to maintain its relevance and usefulness to students and professionals. **Superconductivity: From Basic Physics to the Latest Developments World**

Scientific This volume contains the lecture notes of the “Spring College on Superconductivity” held from 27 April to 19 June 1992 at ICTP. The distinguished faculty of lecturers has provided a wide coverage of topics on the fascinating subject of superconductivity, ranging from basic physics to the latest developments. The comprehensive reviews included in this volume will prove invaluable for research workers and graduate students in the field. Contents: Theory of Normal Metals (G D Mahan)Strong-Coupling Theory of Superconductivity (D Rainer & J A Sauls)Heavy Fermions and Superconductivity: Theory (G Zwicknagl)On the Electronic Structure and Related Physical Properties of 3d Transition Metal Compounds (G A Sawatzky)Theory of Superconductivity in the High Tc Materials (P W Anderson)Specific Heat Studies of Superconductivity (R Srinivasan)Optical Investigations of High-Temperature Superconducting Cuprates (D Mihailovic)Investigation of Magnetic Properties in High Tc Oxides by Muon Spin Rotation (C Bucci)Charge and Spin Separation in One-Dimensional Systems (C A Balseiro et al.) Readership: Researchers in condensed matter physics. Keywords:Strong-Coupling;Superconductivity;High Tc;Charge;Spin **Acquisition of Single Crystal Growth and Characterization Equipment** Final Report for DOE Grant No. DE-FG02-04ER46178 'Acquisition of Single Crystal Growth and Characterization Equipment'. There is growing concern in the condensed matter community that the need for quality crystal growth and materials preparation laboratories is not being met in the United States. It has been suggested that there are too many researchers performing measurements on too few materials. As a result, many user facilities are not being used optimally. The number of proficient crystal growers is too small. In addition, insufficient attention is being paid to the enterprise of finding new and interesting materials, which is the driving force behind much of condensed matter research and, ultimately, technology. While a detailed assessment of this situation is clearly needed, enough evidence of a problem already exists to compel a general consensus that the situation must be addressed promptly. This final report describes the work carried out during the last four years in our group, in which a state-of-the-art single crystal growth and characterization facility was established for the study of novel oxides and intermetallic compounds of rare earth, actinide and transition metal elements. Research emphasis is on the physics of superconducting (SC), magnetic, heavy fermion (HF), non-Fermi liquid (NFL) and other types of strongly correlated electron phenomena in bulk single crystals. Properties of these materials are being studied as a function of concentration of chemical constituents, temperature, pressure, and magnetic field, which provide information about the electronic, lattice, and magnetic excitations at the root of various strongly correlated electron phenomena. Most importantly, the facility makes possible the investigation of material properties that can only be achieved in high quality bulk single crystals, including magnetic and transport phenomena, studies of the effects of disorder, properties in the clean limit, and spectroscopic and scattering studies through efforts with numerous collaborators. These endeavors will assist the effort to explain various outstanding theoretical problems, such as order parameter symmetries and electron-pairing mechanisms in unconventional superconductors, the relationship between superconductivity and magnetic order in certain correlated electron systems, the role of disorder in non-Fermi liquid behavior and

unconventional superconductivity, and the nature of interactions between localized and itinerant electrons in these materials. Understanding the mechanisms behind strongly correlated electron behavior has important technological implications. **Perovskite Materials Synthesis, Characterisation, Properties, and Applications BoD – Books on Demand** The book summarizes the current state of the know-how in the field of perovskite materials: synthesis, characterization, properties, and applications. Most chapters include a review on the actual knowledge and cutting-edge research results. Thus, this book is an essential source of reference for scientists with research fields in energy, physics, chemistry and materials. It is also a suitable reading material for graduate students. **Strongly Correlated Fermions and Bosons in Low-Dimensional Disordered Systems Springer Science & Business Media** The physics of strongly correlated fermions and bosons in a disordered envi ronment and confined geometries is at the focus of intense experimental and theoretical research efforts. Advances in material technology and in low temper ature techniques during the last few years led to the discoveries of new physical of atomic gases and a possible metal phenomena including Bose condensation insulator transition in two-dimensional high mobility electron structures. Situ ations were the electronic system is so dominated by interactions that the old concepts of a Fermi liquid do not necessarily make a good starting point are now routinely achieved. This is particularly true in the theory of low dimensional systems such as carbon nanotubes, or in two dimensional electron gases in high mobility devices where the electrons can form a variety of new structures. In many of these sys tems disorder is an unavoidable complication and lead to a host of rich physical phenomena. This has pushed the forefront of fundamental research in condensed matter towards the edge where the interplay between many-body correlations and quantum interference enhanced by disorder has become the key to the understand ing of novel phenomena. **The Physics of Organic Superconductors and Conductors Springer Science & Business Media** This bang up-to-date volume contains the distilled wisdom of some of the world’s leading minds on the subject. Inside, there is a treasure trove of general (tutorial) and topical reviews, written by leading researchers in the area of organic superconductors and conductors. The papers hail from all over the world, as far afield as the USA and Australia. They cover contemporary topics such as unconventional superconductivity, non-Fermi-liquid properties, and the quantum Hall effect. **Low Temperature Physics 24th International Conference on Low Temperature Physics; LT24 American Institute of Physics** This book represents recent cutting-edge developments in low temperature physics, reported at one of the largest international conferences in physics. The subjects covered are superconductivity, magnetism, quantum gases, quantum liquids and solids, electronic properties of solids, low-temperature experimental techniques, cryogenics, and applications. **Two-Dimensional Coulomb Liquids and Solids Springer Science & Business Media** This coherent monograph describes and explains quantum phenomena in two-dimensional (2D) electron systems with extremely strong internal interactions, which cannot be described by the conventional Fermi-liquid approach. The central physical objects considered are the 2D Coulomb liquid, of which the average Coulomb interaction energy per electron is

much higher than the mean kinetic energy, and the Wigner solid. The text provides a new and comprehensive review of the remarkable properties of Coulomb liquids and solids formed on the free surface of liquid helium and other interfaces. This book is intended for graduate students and researchers in the fields of quantum liquids, electronic properties of 2D systems, and solid-state physics. It includes different levels of sophistication so as to be useful for both theorists and experimentalists. The presentation is largely self-contained, and also describes some instructive examples that will be of general interest to solid-state physicists. **Quantum Theory of the Electron Liquid Cambridge University Press** Publisher Description **Field Theories for Low-Dimensional Condensed Matter Systems Spin Systems and Strongly Correlated Electrons Springer Science & Business Media** This book is especially addressed to young researchers in theoretical physics with a basic background in Field Theory and Condensed Matter Physics. The topics were chosen so as to offer the largest possible overlap between the two expertises, selecting a few key problems in Condensed Matter Theory which have been recently revisited within a field-theoretic approach. The presentation of the material is aimed not only at providing the reader with an overview of this exciting frontier area of modern theoretical physics, but also at elucidating most of the tools needed for a technical comprehen sion of the many papers appearing in current issues of physics journals and, hopefully, to enable the reader to tackle research problems in this area of physics. This makes the material a live creature: while not pretending it to be exhaustive, it is tutorial enough to be useful to young researchers as a starting point in anyone of the topics covered in the book. **Magnetism and Transport Phenomena in Spin-Charge Coupled Systems on Frustrated Lattices Springer** In this thesis, magnetism and transport phenomena in spin-charge coupled systems on frustrated lattices are theoretically investigated, focusing on Ising-spin Kondo lattice models and using a combination of Monte Carlo simulation and other techniques such as variational calculations and perturbation theory. The emphasis of the study is on how the cooperation of spin-charge coupling and geometrical frustration affects the thermodynamic properties of the Kondo lattice models; it presents the emergence of various novel magnetic states, such as the partial disorder, loop-liquid, and spin-cluster states. The thesis also reveals that the magnetic and electronic states and transport properties of these models demonstrate peculiar features, such as Dirac half-metals, anomalous Hall insulators, and spin Hall effects. Study of novel magnetic states and exotic transport phenomena in Kondo lattice systems is a field experiencing rapid progress. The interplay of charge and spin degrees of freedom potentially gives rise to various novel phases and transport phenomena which are related to strongly correlated electrons, frustrated magnetism, and topological states of matter. The results presented in this thesis include numerical calculations that are free from approximations. Accordingly, they provide reliable reference values, both for studying magnetism and transports of related models and for experimentally exploring novel states of matter in metallic magnets. **Concise Encyclopedia of Magnetic and Superconducting Materials Elsevier** Magnetic and superconducting materials pervade every avenue of the technological world – from microelectronics and mass-data storage to medicine and heavy engineering. Both

areas have experienced a recent revitalisation of interest due to the discovery of new materials, and the re-evaluation of a wide range of basic mechanisms and phenomena. This Concise Encyclopedia draws its material from the award-winning Encyclopedia of Materials and Engineering, and includes updates and revisions not available in the original set -- making it the ideal reference companion for materials scientists and engineers with an interest in magnetic and superconducting materials. * Contains in excess of 130 articles, taken from the award-winning Encyclopedia of Materials: Science and Technology, including ScienceDirect updates not available in the original set. * Each article discusses one aspect of magnetic and superconducting materials and includes photographs, line drawings and tables to aid the understanding of the topic at hand. * Cross-referencing guides readers to articles covering subjects of related interest. **Strongly Correlated Electron Systems Iii - Proceedings Of The Adriatico Research Conference And Miniworkshop World Scientific Handbook on the Physics and Chemistry of Rare Earths Elsevier** This volume of the Handbook adds five new chapters to the science of rare earths. Two of the chapters deal with intermetallic compounds. An overview of ternary systems containing rare earths, transition metals and indium - Chapter 218 - opens the volume. It is followed by Chapter 219 sorting out relationships between superconductivity and magnetism. The next two chapters are dedicated to complex compounds of rare earths: Chapter 220 describes structural studies using circularly polarized luminescence spectroscopy of lanthanide systems, while Chapter 221 examines rare-earth metal-organic frameworks, also known as coordination polymers. The final Chapter 222 deals with the catalytic activity of rare earths in site-selective hydrolysis of DNA and RNA. Ya. Kalychak, V. Zaremba, R. Pöttgen, M. Lukachuk, and R.-D. Hoffmann review the synthesis conditions, isothermal sections of phase diagrams, crystallography and basic physical properties of ternary intermetallic compounds consisting of the rare-earth metals, transition metals and indium. P. Thalmeier and G. Zwicknagl revisit the last decade of research uncovering some of the mysteries of the superconducting state, especially those related to heavy fermion superconductivity and the co-existence of the superconducting and exotic magnetically ordered states. J. P. Riehl and G. Muller review how the molecular stereochemistry of lanthanide complexes both in pure forms and in mixtures can be probed using circularly polarized luminescence. O. Guillou and C. Daiguebonne assess rare earth-containing metal-organic frameworks, also known as coordination polymers, which hold a potential as working bodies for opto-electronic and magnetic devices, microporous materials for a variety of uses, such as size- and shape-selective separations, catalyst support and hydrogen storage materials. Concluding the volume, M. Komiyama argues that future biotechnology may well rely on the use of rare-earth ions as unique catalysts that can slice DNA and RNA in order to allow their reprogramming, and thus lead to more effective bioengineered processes. **Low-Dimensional Molecular Metals Springer Science & Business Media** This monograph assimilates new research in the field of low-dimensional metals. It provides a detailed overview of the current status of research on quasi-one- and two-dimensional molecular metals, describing normal-state properties, magnetic field effects, superconductivity, and the phenomena of interacting p and d electrons. It includes a number of findings likely to become standard material in

future textbooks on solid-state physics. **High T\dc Superconductivity and the C\d6\d0 Family CRC Press Physical Review & Physical Review Letters: M-Z Scaling Behavior of Heavy Fermion Metals [Elektronisk Resurs]** Strongly correlated Fermi systems are fundamental systems in physics that are best studied experimentally, which until very recently have lacked theoretical explanations. This review discusses the construction of a theory and the analysis of phenomena occurring in strongly correlated Fermi systems such as heavy-fermion (HF) metals and two-dimensional (2D) Fermi systems. It is shown that the basic properties and the scaling behavior of HF metals can be described within the framework of a fermion condensation quantum phase transition (FCQPT) and an extended quasiparticle paradigm that allow us to explain the non-Fermi liquid behavior observed in strongly correlated Fermi systems. In contrast to the Landau paradigm stating that the quasiparticle effective mass is a constant, the effective mass of new quasiparticles strongly depends on temperature, magnetic field, pressure, and other parameters. Having analyzed the collected facts on strongly correlated Fermi systems with quite a different microscopic nature, we find these to exhibit the same non-Fermi liquid behavior at FCQPT. We show both analytically and using arguments based entirely on the experimental grounds that the data collected on very different strongly correlated Fermi systems have a universal scaling behavior, and materials with strongly correlated fermions can unexpectedly be uniform in their diversity. Our analysis of strongly correlated systems such as HF metals and 2D Fermi systems is in the context of salient experimental results. Our calculations of the non-Fermi liquid behavior, the scales and thermodynamic, relaxation and transport properties are in good agreement with experimental facts.