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(Eds.)

Spin Dynamics in Confined Magnetic Structures II



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Spin Dynamics In Confined Magnetic Structures Ii

**Akinobu Yamaguchi,Atsufumi
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Spin Dynamics in Confined Magnetic Structures II Burkard Hillebrands, Kamel Ounadjela, 2003-03-12 This second volume of the book on spin dynamics in confined magnetic structures covers central aspects of spin dynamic phenomena so that researchers can find a comprehensive compilation of the current work in the field Introductory chapters help newcomers to understand the basic concepts and the more advanced chapters give the current state of the art for most spin dynamic issues in the milliseconds to femtoseconds range Both experimental techniques and theoretical work are discussed The comprehensive presentation of these developments makes this volume very timely and valuable for every researcher working in the field of magnetism It describes the new experimental techniques which have advanced this field very rapidly Among the techniques covered particular attention is given to those involving high temporal elemental and spatial resolution as well as to techniques involving magnetic field pulses with very short rise times and durations

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Mayergoyz, Giorgio Bertotti, Claudio Serpico, 2009-04-20 As data transfer rates increase within the magnetic recording industry improvements in device performance and reliability crucially depend on the thorough understanding of nonlinear magnetization dynamics at a sub nanoscale level This book offers a modern stimulating approach to the subject of nonlinear magnetization dynamics by discussing important aspects such as the Landau Lifshitz Gilbert LLG equation analytical solutions and the connection between the general topological and structural aspects of dynamics An advanced reference for the study and understanding of nonlinear magnetization dynamics it addresses situations such as the understanding of spin dynamics in short time scales and device performance and reliability in magnetic recording Topics covered include nonlinear magnetization dynamics and the Landau Lifshitz Gilbert equation nonlinear dynamical systems spin waves ferromagnetic resonance and pulsed magnetization switching The book explains how to derive exact analytical solutions for the complete nonlinear problem and emphasises the connection between the general topological and structural aspects of nonlinear magnetization dynamics and the discretization schemes better suited to its numerical study It is an exceptional research tool providing an advanced understanding of the study of magnetization dynamics in situations of fundamental and technological interest **Spin Dynamics in Confined Magnetic Structures**, 2002 **Spin Dynamics in Confined Magnetic**

Structures III Burkard Hillebrands, Andre Thiaville, 2014-10-20 The third volume of this book addresses central aspects of spin dynamic phenomena on a tutorial level This volume concentrates on new experimental techniques such as ferromagnetic resonance force microscopy and two photon photoemission There is a chapter devoted to the hot subject of spin transfer torque The comprehensive presentation makes this a timely and valuable resource for every researcher working in the field of magnetism **Magnetic Heterostructures** H. Zabel, Samuel D. Bader, 2007-10-26 Heterostructures consist of

combinations of different materials which are in contact through at least one interface Magnetic heterostructures combine different physical properties which do not exist in nature Examples are semiconductors ferromagnets superconductors ferromagnets or ferromagnets antiferromagnets These combinations display new physical properties different from any single one of them Interlayer exchange coupling exchange bias proximity effects giant magneto resistance tunneling magneto resistance spin spininjection and spintransport are examples for new physical phenomena which relay on the combination of various metal semiconductor and oxide layers Heterostructures are generated by stack wise deposition of these materials layers and by lateral structuring them via lithographic processes This book provides the first comprehensive overview of an exciting and fast developing field of research which has already resulted in numerous applications and is the basis for future spintronic devices **Introduction to Surface and Superlattice Excitations** Michael G. Cottam, D.R. Tilley, 2019-05-07

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 kinds of excitation are

considered from a unified point of view Throughout the book the authors are careful to relate theory and experiment and all of the most important experimental techniques are described The theoretical treatment assumes only a knowledge of undergraduate physics except for Green function methods that are used in a few sections these methods are developed in an appendix The book also contains extensive references enabling the reader to consult the research and review literature Each of the main chapters contains problems to allow the reader to develop topics presented in the text Physics of Quantum Rings Vladimir M. Fomin, 2025-08-19 Excerpts from the recension on the 1st edition The book published by Vladimir M Fomin from Leibniz Institute for Solid State and Materials Research Dresden is an authoritative monograph that offers for readers a broad exhaustive overview about the current status of the Physics of Quantum Rings All chapters are accessible for readers with knowledge of physics and engineering sciences within the advanced level studies The book explores in depth the physics of quantum interference phenomena like the Aharonov Bohm effect which are essential for Quantum Rings A good third of the book is dedicated to fabrication characterization and physical properties of such structures The fabrication includes such methods as self organized arrangement and crystal growth with molecular beam epitaxy as well as high resolution lithography The second third of the book represents the theory of Quantum Rings especially under the perspective of their materials and optical properties the Coulomb interaction and finally their mathematical modeling The last third of the book focuses on the Aharonov Bohm effect of excitons a very new effect which is manifested through the optical properties of Quantum Rings The unique benefit of collecting such different topics in one band consists in enabling a holistic understanding of Quantum Rings This approach is necessary to ensure a further development in this field On the one hand this is a deepening exploration On the other hand it is equally important for implementation of the gained understanding in applications for future devices Translated from German K Karrai Physik Journal 15 52 53 2016 Excerpts from the recension on the 2nd edition A Lorke Physik Journal 18 91 2019 The editor Vladimir Fomin and contributors show impressively in their book which has now been published in a second edition that the now traditional classification into 3 2 1 or 0 dimensional systems is not as comprehensive as it seems This is because in contrast to the above mentioned systems Quantum Rings in mathematical sense are not singly connected And already the question whether a Quantum Ring is a closed quantum wire or a quantum dot from which the interior is cut out demonstrates how diverse and novel is the physics offered by Quantum Rings Also in the new edition the numerous authors illuminate the topic from different perspectives from materials science aspects of the growth of Quantum Rings through their optical and electronic characterization to theoretical studies of exotic topologies such as M bius stripes The new division into four Sections topology driven effects fabrication and characterization optical Aharonov Bohm Effect theory succeeded It is gratifying that the newly added chapters deal with current developments and concern such topics as THz spectroscopy or 2D materials The book is certainly not an easy reading However for both advanced students and scientists who wish to delve in larger breadth and depth into the topic this

collection of reviews offers an extensive material showing that also beyond a point a line and a plane there is still plenty of room in the bottom Translated from German A Lorke Physik Journal 18 91 2019 **Handbook of Nanomagnetism** Rosa A. Lukaszew, 2015-10-06 This unique handbook compiles and details cutting edge research in nanomagnetism and its applications in spintronics magnetoplasmonics and nonlinear magneto optics Fundamental aspects of magnetism relevant to nanodevices and new spin transfer torque random access memory STT RAM current induced domain wall motion memory and spin torque oscill **Nanomagnetism and Spintronics** André Thiaville, Yoshinobu Nakatani, 2013-10-07 Spin transfer torque manifests itself in two main geometries either submicrometer diameter pillars composed of magnetic multilayers flooded by a current perpendicular to plane CPP or nanowires with current flowing in their plane CIP The first situation can be described rather well from the magnetic point of view in the framework of the macrospin model see by Y Suzuki In the latter case the typical situation is that of a magnetic domain wall under CIP current with many internal degrees of freedom In by H Kohno and G Tatara a simplest model of the domain wall called collective coordinates model has been introduced to study this question In this chapter we will address the entire manifold of the degrees of freedom in the domain wall by micromagnetic numerical simulations and apply this to the physics of CIP spin transfer in magnetic domain walls We will consider soft magnetic materials only where domain wall structures and dynamics are controlled by magnetostatics This corresponds to the largest part of experiments that have been performed up to now soft magnetic materials having generally lower coercive forces and domain wall propagation fields The experimental counterpart to this chapter can be found in by T Ono and T Shinjo After briefly introducing micromagnetics and the typology of domain walls in samples shaped into nanostrips we start by reviewing the field driven dynamics in such samples This situation was indeed considered first historically and led to the introduction of several useful concepts Prominent among them are the separation between steady state and precessional regimes and the existence of a maximum velocity for a domain wall The spin transfer torque induced domain wall dynamics will then be addressed considering first the implementation of the CIP spin transfer torque in micromagnetics with several components as introduced by theory Comparison will be made to the field driven case with similarities and differences highlighted In the nascent field of nanomagnetism and spintronics micromagnetics can be considered to play the role of a translator There are on one side experiments and on the other side theories about interaction between magnetization and spin polarized electrical currents Micromagnetics is a tool that translates the equations of the latter into quantitative predictions that can be compared to the former Considering the present state of the subject of this book with rapidly advancing experiments and theories keeping in touch those two aspects of research is very important for its sound development This is the objective of this chapter **Spin Wave Confinement** Sergej O. Demokritov, 2019-05-08 This book presents recent scientific achievements in the investigation of magnetization dynamics in confined magnetic systems Introduced by Bloch as plane waves of magnetization in unconfined ferromagnets spin waves currently play an

important role for description of very small systems Spin wave confinement effect was experimentally discovered in the 1990s in permalloy microstripes The diversity of systems where this effect is observed has been steadily growing since then most of which will be addressed in this book The book includes six chapters which originate from different groups of experimentalists and theoreticians dominating the field since the discovery of the effect Different chapters of the book reflect different facets of spin wave confinement providing a comprehensive description of the effect and its place in modern magnetism It will be of value for scientists and engineers working on magnetic storage elements and magnetic logic and is also suitable as an advanced textbook for graduate students

Nanostructured Materials for Magnetoelectronics Bekir

Aktas, Faik Mikailzade, 2013-01-17 This book provides an up to date review of nanometer scale magnetism and focuses on the investigation of the basic properties of magnetic nanostructures It describes a wide range of physical aspects together with theoretical and experimental methods A broad overview of the latest developments in this emerging and fascinating field of nanostructured materials is given with emphasis on the practical understanding and operation of submicron devices based on nanostructured magnetic materials

Springer Handbook of Surface Science Mario Rocca, Talat Rahman, Luca

Vattuone, 2021-01-14 This handbook delivers an up to date comprehensive and authoritative coverage of the broad field of surface science encompassing a range of important materials such as metals, semiconductors, insulators, ultrathin films and supported nanoobjects Over 100 experts from all branches of experiment and theory review in 39 chapters all major aspects of solid state surfaces from basic principles to applications including the latest ground breaking research results Beginning with the fundamental background of kinetics and thermodynamics at surfaces the handbook leads the reader through the basics of crystallographic structures and electronic properties to the advanced topics at the forefront of current research These include but are not limited to novel applications in nanoelectronics, nanomechanical devices, plasmonics, carbon films, catalysis and biology The handbook is an ideal reference guide and instructional aid for a wide range of physicists, chemists, materials scientists and engineers active throughout academic and industrial research

Nanomagnetic Materials Akinobu

Yamaguchi, Atsufumi Hirohata, Bethanie Stadler, 2021-06-28 Nanomagnetic Materials: Fabrication, Characterization and Application explores recent studies of conventional nanomagnetic materials in spintronics, data storage, magnetic sensors and biomedical applications In addition the book also reviews novel magnetic characteristics induced in two dimensional materials, diamonds and those induced by the artificial formation of lattice defect and heterojunction as novel nanomagnetic materials Nanomagnetic materials are usually based on d and f electron systems They are an important solution to the demand for higher density of information storage arising from the emergence of novel technologies required for non volatile memory systems Advances in the understanding of magnetization dynamics and in the characteristics of nanoparticles or surface of nanomagnetic materials is resulting in greater expansion of applications of nanomagnetic materials including in biotechnology, sensor devices, energy harvesting and power generating systems This book provides a cogent overview of the

latest research on novel nanomagnetic materials including spintronic nanomagnets molecular nanomagnets self assembling magnetic nanomaterials nanoparticles multifunctional materials and heterojunction induced novel magnetism Explains manufacturing principles and process for nanomagnetic materials Discusses physical and chemical properties and potential industrial applications such as magnetic data storage sensors oscillator permanent magnets power generations and biomedical applications Assesses the major challenges of using magnetic nanomaterials on a broad scale *Magnetization Dynamics of Single Domain Nanomagnets* Suqin Wang, 2007 **Solid State Physics**, 2014-05-15 Solid state physics is the branch of physics primarily devoted to the study of matter in its solid phase especially at the atomic level This prestigious serial presents timely and state of the art reviews pertaining to all aspects of solid state physics Contributions from leading authorities Informs and updates on all the latest developments in the field

Spin Dynamics In Confined Magnetic Structures Ii Book Review: Unveiling the Power of Words

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Table of Contents Spin Dynamics In Confined Magnetic Structures Ii

1. Understanding the eBook Spin Dynamics In Confined Magnetic Structures Ii
 - The Rise of Digital Reading Spin Dynamics In Confined Magnetic Structures Ii
 - Advantages of eBooks Over Traditional Books
2. Identifying Spin Dynamics In Confined Magnetic Structures Ii
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Spin Dynamics In Confined Magnetic Structures Ii
 - User-Friendly Interface
4. Exploring eBook Recommendations from Spin Dynamics In Confined Magnetic Structures Ii
 - Personalized Recommendations
 - Spin Dynamics In Confined Magnetic Structures Ii User Reviews and Ratings
 - Spin Dynamics In Confined Magnetic Structures Ii and Bestseller Lists

5. Accessing Spin Dynamics In Confined Magnetic Structures Ii Free and Paid eBooks
 - Spin Dynamics In Confined Magnetic Structures Ii Public Domain eBooks
 - Spin Dynamics In Confined Magnetic Structures Ii eBook Subscription Services
 - Spin Dynamics In Confined Magnetic Structures Ii Budget-Friendly Options
6. Navigating Spin Dynamics In Confined Magnetic Structures Ii eBook Formats
 - ePub, PDF, MOBI, and More
 - Spin Dynamics In Confined Magnetic Structures Ii Compatibility with Devices
 - Spin Dynamics In Confined Magnetic Structures Ii Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Spin Dynamics In Confined Magnetic Structures Ii
 - Highlighting and Note-Taking Spin Dynamics In Confined Magnetic Structures Ii
 - Interactive Elements Spin Dynamics In Confined Magnetic Structures Ii
8. Staying Engaged with Spin Dynamics In Confined Magnetic Structures Ii
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Spin Dynamics In Confined Magnetic Structures Ii
9. Balancing eBooks and Physical Books Spin Dynamics In Confined Magnetic Structures Ii
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Spin Dynamics In Confined Magnetic Structures Ii
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Spin Dynamics In Confined Magnetic Structures Ii
 - Setting Reading Goals Spin Dynamics In Confined Magnetic Structures Ii
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Spin Dynamics In Confined Magnetic Structures Ii
 - Fact-Checking eBook Content of Spin Dynamics In Confined Magnetic Structures Ii
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning

- Utilizing eBooks for Skill Development
- Exploring Educational eBooks

14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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