

Dear GMAG members,

This newsletter contains information on the magnetism sorting categories, the GMAG-sponsored Focused Session Topics, and magnetism-related tutorials for the March 2005 APS meeting. There is also information on free student memberships, outreach support, and fellowship and award nominations for those who might have missed previous announcements about them. We have also included a list of upcoming magnetism-related meetings of which we have been informed.

Best regards,

Peter Schiffer
GMAG Chair

STUDENT MEMBERSHIP SUPPORT: To encourage more students to participate in GMAG events, GMAG has implemented (on a trial basis) free student membership in GMAG: Students who are members of APS can join GMAG without paying additional dues (GMAG will pay student GMAG dues to the APS). Interested students should email Jonathan Sun (jonsun@watson.ibm.com) with their name, APS membership number, mailing address, and email address (note that students can join the APS free for one trial year and \$26 for each succeeding year).

GMAG OUTREACH FUNDING: GMAG has funds available to its members to support outreach activities. Limited funds (up to \$2500 per project) are available to cover supplies and expenses associated with activities which aim to educate non-scientists about magnetism and its applications. Preference will be given to innovative activities that will be documented so that they can be reproduced elsewhere. The outcome of the activities will be disseminated to the GMAG membership through the Newsletter and to the broader magnetism community through the GMAG website. Interested GMAG members should prepare a 1-2 page summary of the proposed activity (including expected duration and outcome) along with a 1 page CV and a list of anticipated expenses. These should be mailed as a single file in .pdf format to the GMAG Chair, Peter Schiffer, at schiffer@phys.psu.edu.

NOMINATIONS FOR APS FELLOWSHIPS AND PRIZES/AWARDS: GMAG is allowed to nominate 2-3 people for APS Fellowship each year (0.5% of our membership). The nomination deadline for the upcoming year is April 1, 2005 (information can be found at <http://www.aps.org/fellowship/>). You might want to start preparing a nomination for next year for a person you think deserves APS Fellowship. The nomination deadline for APS prizes and awards for this year has passed (July 1, 2004), but it is not too early to begin thinking of worthy people from the magnetism community for next year (<http://www.aps.org/praw/>).

MARCH MEETING 2005 (ABSTRACT SUBMISSION DEADLINE: DEC. 1, 5:00 PM EST)
An important function of GMAG is to plan and organize sessions and symposia on topics associated with magnetism at the March APS Meeting. This is done by sponsoring Focused Session Topics, by organizing Invited Symposia, and by sorting contributed abstracts for Category 6. We encourage our members to participate in the APS meeting program, and listed below are the magnetism sorting

categories as well as two magnetism-related tutorials and the GMAG-sponsored focus topics for 2005. Magnetism-related invited symposia will be announced in the next newsletter.

MAGNETISM SORTING CATEGORIES

- 06.1 Cooperative Phenomena (incl. spin structures, spin waves, phase transitions)
- 06.2 Magnetic Domains & Magnetic Field Phenomena: Dynamic & Static
- 06.3 Correlated Electrons (incl. heavy fermions, oxides)
- 06.4 Spin Dependent Transport: GMR, CMR, tunneling, spin injection, semiconductors
- 06.5 Magnetic Recording Materials and Phenomena
- 06.6 Magnetic Anisotropy: hard & soft materials
- 06.7 Artificially Structured or Self-Assembled Magnetic Materials (incl. multilayers & dots)
- 06.8 Low Dimensional Magnetism (incl. molecules, chains, surfaces)
- 06.9 Frustrated or Disordered Magnetic Materials
- 06.10 New Techniques and Applications

MAGNETISM-RELATED TUTORIALS

Tutorials are held on Sunday, March 20th and require pre-registration. See <http://www.aps.org/meet/MAR05/special.cfm#tutorials> for details.

T3. Spintronics

Organizer: Mark Johnson, Naval Research Laboratory

“Spintronics” is the emerging field of basic and applied research supporting electronic device structures that utilize electronic spin for new and unique functionality. Applications for conventional digital electronics include low power, ultrahigh density nonvolatile magnetoresistive random access memory (MRAM). MRAM chips, which have performance advantages over silicon technology, recently have become commercially available. Unconventional information processing applications include quantum computing. Biotechnology offers important new directions and opportunities.

Speakers:

Stuart S. P. Parkin, IBM Almaden Research Center
Sankar Das Sarma, University of Maryland
Masaaki Tanaka, University of Tokyo, Japan
Lloyd J. Whitman, Naval Research Laboratory

T7. Molecular Magnets

Organizer: Andrew Kent, NYU

Research on molecule-based-nanomagnets has progressed rapidly in recent years in materials known as single molecule magnets (SMMs), which exhibit a host of remarkable quantum phenomena. SMMs represent a molecular or 'bottom-up' approach to nanomagnetism, with advantages that include chemical control of molecular structure, spin, magnetic anisotropy as well as intra- and intermolecular magnetic interactions. They display properties of ferromagnetic particles prepared by conventional lithographic 'top-down' methods in a manner that enables fundamental physics studies. For example, quantum tunneling of the magnetization (QTM) has been clearly demonstrated and studied in these materials. This tutorial will provide background toward understanding recent developments in this area, which includes advances in material synthesis, experiment and theory.

Speakers

George Christou, University of Florida, Single Molecule Magnets-Materials

Eugene Chudnovsky, CCNY, QTM Theory

Andrew Kent, NYU, QTM Experiment

GMAG-SPONSORED FOCUS TOPICS

6.11.1. Theory and Simulation of Magnetism and Spin Dependent Properties (DCOMP/DMP/GMAG)

The purpose of this focus topic is to explore recent advances in theory and modeling of magnetic and spin dependent properties of materials. The topic will include methods and materials systems as well as magnetic and spin dependent properties. Of particular concern are magnetic materials in reduced dimension where surface and interface effects become increasingly dominant and influence the spin structure, spin dynamics and spin transport. Thus it is expected that a significant part of this focus topic will be devoted to theoretical and computational issues in connection with magnetic nanosystems such as 2D-multilayers, 1D-wires, 0D-particles, molecules, and impurities; including metals, alloys, magnetic semi-conductors, magnetic oxides and magnetic molecules in various environments (isolated structures as well as embedded in the bulk and on surfaces). Properties include magnetic structure, mechanisms of exchange coupling, anisotropy, spin-dynamics, damping mechanisms, domain structure, hysteretic phenomena, phase transitions, magneto-optics, spin transport, spin injection and quantum tunneling. Methods include first-principles density functional theory based methods (LDA, etc) as well as new developments for strongly correlated systems (such as LDA plus dynamical mean field theory), spin models, Monte Carlo and spin dynamics methods, and micromagnetic modeling. Of particular interest are methods for multiscale modeling that bridge length scales and approaches to extend the time scale of simulations.

Organizers:

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6.11.2 Magnetic Nanoparticles, Nanostructures, and Heterostructures (DMP/GMAG)

This session focuses on emerging magnetic properties at nanometer-scale. Magnetic nanostructures include films, multilayers, nanocomposites, hybrid structures, wedges, nanowires, magnetic point contacts, nanoparticles, self-organized and ordered nanoparticle arrays, and patterned films. This session will cover experimental and theoretical advances in low-dimensional magnetism, proximity effects, interlayer magnetic coupling, exchange spring, exchange bias, magnetic quantum confinement, magnetic anisotropy, effects of structural disorder, hysteresis modeling, and other magnetic phenomena. Of special interest are the fabrication of nanostructures with atomic-scale control, synthesis and assembly of nanoparticles and arrays, high-resolution characterization methods with site and/or element specificity, novel techniques for the creation of nanoscale magnetic features, and other unusual physical phenomena present in these systems.

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6.11.3 Phase Complexity and Enhanced Functionality in Magnetic Oxides (DMP/GMAG)

Magnetic materials with several strongly-coupled physical degrees of freedom are susceptible to microscopic phase complexity which has been found to be conducive to high-functionality. One important example of the enhanced functionality in response to external magnetic field is the colossal magnetoresistance effect in manganites which directly correlates with multi-scale phase coexistence. Other examples include large magneto-electric effect, magneto-capacitance effect, and magneto-calorimetric effect in complex materials. Scientific understanding of the interrelationship between phase complexity and macroscopic physical properties is of prime importance for controlling the technological functionality of complex materials, and will be the main focus of the session. Experimental, theoretical and computational investigations in this topic, of both of fundamental and applied nature, will be addressed. Among the main goals is an understanding of the relation between magnetic and electronic properties with other physical phenomena such as magneto-transport, lattice, elastic and magnetic excitations, surface behavior, and electron correlation effects. The similarities between the many different compounds will be emphasized.

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6.11.4 Spin Transport and Magnetization Dynamics in Metal-Based Systems (GMAG/DMP)

This session will focus on experimental and theoretical investigations that elucidate and/or utilize the transport and transfer of spin in metal-based magnetic systems. Studies that emphasize spin phenomena in semiconductor systems will be covered in a separate focus session. Topics of interest include all aspects of spin-dependent transport and scattering, in the diffusive, ballistic, tunneling and hot electron transport regimes as evidenced, for example, in giant magnetoresistance (GMR), tunneling magnetoresistance (TMR), ballistic magnetoresistance, tunneling spectroscopy of spin states, spin filtering and related effects. Also of particular interest

are studies of the interplay between non-equilibrium carriers and magnetization dynamics in point contacts, magnetic pillar structures and magnetic nanowires. Additional topics include, but are not limited to, interfacial spin transport, spin injection and detection, spin relaxation time, damping mechanisms in ferromagnets, and spin-current-driven domain wall dynamics, as well as studies in ferromagnetic - normal metal and ferromagnetic - superconductor systems.

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6.11.5 Spin-Dependent Phenomena in Semiconductors (DMP/GMAG)

Recent progress in the understanding of spin-dependent phenomena in semiconductors has resulted from a combination of research on fundamental optical and transport properties as well as innovative materials science and device development. This focus topic addresses spin injection, manipulation, transport, and detection in conventional as well as ferromagnetic semiconductors. Abstracts are solicited in the general areas of 1) spin dynamics and transport in semiconductors, including spin transport in mesoscopic systems, electrical spin injection and detection, optical spin injection and detection, optical and electronic control of spin coherence, effects of spin-orbit coupling, and hyperfine effects; 2) growth, characterization, electronic structure, and electrical and optical control of magnetic properties in ferromagnetic semiconductors; 3) ferromagnet-semiconductor devices, including new approaches to spin injection and detection; and 4) developments in related fields, such as organic semiconductors and quantum computing, that relate to spin-dependent phenomena in semiconductors.

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UPCOMING MAGNETISM-RELATED CONFERENCES:

A feature of the GMAG web site (<http://www.aps.org/units/gmag/>) is a listing of upcoming conferences on magnetism-related topics (also listed below). If you would like to feature your meeting or conference on this web page, please contact the GMAG Secretary/Treasurer, Caroline Ross (caross@mit.edu).

49th Conference on Magnetism and Magnetic Materials

November 7-11, 2004
Jacksonville, Florida
www.magnetism.org

International Workshop on Nanomagnetism

November 14-18, 2004
Havana, Cuba
www.nanomagnetism.org

Materials Research Society Fall 2004 Meeting

29 Nov. – 3 Dec. 2004
Boston, MA
www.mrs.org

2005 March Meeting

March 21-25, 2005
Los Angeles, CA
www.aps.org

Materials Research Society (MRS) 2005 Spring Meeting

San Francisco, California
March 28-April 1, 2005
www.mrs.org

2005 Intermag Conference

April 5-8, 2005

Nagoya, Japan

www.intermagconference.com

50th Conference on Magnetism and Magnetic Materials

October 30 -November 3, 2005

San Jose, CA

www.magnetism.org

Materials Research Society (MRS) 2005 Fall Meeting

Boston, Massachusetts

November 28 - December 2, 2005

www.mrs.org

10th Joint MMM/Intermag Conference

January 7-11, 2007,

Baltimore, Maryland