



GMAG NEWSLETTER

Topical Group on Magnetism and its Applications
No. 17, July 2004

A Focused Group within The American Physical Society

A Note from the Chair

Dear GMAG members,

As current Chair of the APS Topical Group on Magnetism and its Applications (GMAG), I would like to take this opportunity to thank you for belonging to GMAG, to convey a few items of information, and to ask for your participation in several GMAG activities, particularly the organization of the next March meeting symposia and invited talks.

This newsletter contains complete information on the five Focus Session topics we will be sponsoring for the March '05 APS meeting, including information on how to suggest speakers and contribute abstracts. We are soliciting suggestions for the 3 invited

symposia we are allowed to sponsor. Also in this newsletter is information on our student awards and membership support, our outreach support program, and a reminder of the procedures for nominating worthy people from the magnetism community for a prize or Fellowship. Information is also provided below about nomination procedures for candidates for the next GMAG election and a listing of upcoming magnetism-related conferences.

Best regards and thanks again for your participation in GMAG,

–Peter Schiffer
GMAG Chair

STUDENT AWARDS AND STUDENT MEMBERSHIP SUPPORT

In a continuing effort to encourage graduate students working in magnetism, GMAG is continuing two policies which were implemented on a trial basis last year:

1) 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 APS). To join, students need to send a note to Jonathan Sun (jonsun@watson.ibm.com) with their name, APS membership number, mailing address, and e-mail address (note that students can join APS free for one trial year and \$26 for each succeeding year).

2) Outstanding Dissertation in Magnetism Awards: For the second year in a row, GMAG will award up to three dissertation awards at the next March Meeting. These awards will recognize students who have conducted outstanding research in magnetism leading to their dissertation and will consist of an invited talk in an appropriate session at the March Meeting, a \$500 prize to the student (not intended as a travel award, but as a prize to the student), and up to \$250 toward travel expenses to the APS meeting. The student must be in his or her final year before graduation with a Ph.D., and both the student and the advisor must be current members of GMAG. Nominations will consist of a nominating letter provided by the student's advisor and an extended abstract of the research (1-2 pages). The nominating letter must address the following issues:

- the quality and independence of the student's work;
- the student's speaking ability;
- the year the student began graduate school;

- the student's expected completion date (must be before Sept. 1, 2005 to be eligible for the 2005 March Meeting);
- assessment of the student's future potential as a research scientist.

Nominations should be sent by email to Peter Schiffer (schiffer@phys.psu.edu) by **Sept. 1, 2004**.

Evaluation of the nominations will be conducted by the GMAG Executive Committee.

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Standing Committees:

Nominating Committee (appointed by GMAG Chair):

Mark Stiles (Chair)

mark.stiles@nist.gov

Fellowship Committee (GMAG Bylaws specify that GMAG Vice-Chair be the Chair of the Fellowship Committee):

Jim Rhyne

rhyne@lanl.gov

Executive Committee (The recent amendment

to the Bylaws specifies that the Executive Committee Members also serve on the Fellowship Committee)

Program Committee (by formal convention

Chair-Elect serves as Chair of the Program Committee):

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Members at Large of the Executive Committee (Term ends March xxxx)

Jonathan Sun (2005)

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Julie Borchers (2005)

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Mark Stiles (2006)

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Jeff Childress (2007)

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NOMINATIONS FOR THE NEXT GMAG ELECTION

We need suggestions for good candidates for the GMAG offices of Vice Chair (who becomes Chair-Elect and then Chair), and 2 new Members-at-Large for the Executive Committee. Mark Stiles (*stiles@nist.gov*) is Chair of the Nominations Committee. Please email suggestions to him no later than Sept. 1, 2004.

GMAG OUTREACH FUNDING

Starting this year, GMAG will make 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*.

MARCH MEETING 2005

NOMINATIONS FOR SYMPOSIA AND FOCUSED SESSION TOPICS

An important task of GMAG is to plan and organize sessions on topics involving magnetism at the March APS Meeting (sorting category 6). This is done by sponsoring focus topics, organizing invited symposia, and sorting the contributed abstracts for category 6.

For the March 2005 Meeting, GMAG is co-sponsoring the following five focus sessions:

- 6.11.1 Theory and Simulation of Magnetism and Spin Dependent Properties (DCOMP/DMP/GMAG)
- 6.11.2 Magnetic Nanoparticles, Nanostructures, and Heterostructures (DMP/GMAG)
- 6.11.3 Phase Complexity and Enhanced Functionality in Magnetic Oxides (DMP/GMAG)
- 6.11.4 Spin Transport and Magnetization Dynamics in Metal-Based Systems (GMAG/DMP)
- 6.11.5 Spin-Dependent Phenomena in Semiconductors (DMP/GMAG)

Descriptions, organizers, and contact information for each topic are listed below. Each focus session typically has one invited speaker and up to 12 contributed talks. To suggest invited speakers for a given focus session, please contact the organizers through the on-line form at http://positron.aps.org/wcgi/dmp_invited.pl. The deadline for suggesting invited speakers to focus session organizers is **August 16, 2004**.

Contributed talks for the focus sessions need to be submitted directly to APS at <http://abstracts.aps.org/> following their procedures. Please use the appropriate sorting category above for a contributed talk that fits into a focus session. The deadline for submitting a contributed talk abstract for a focus session (or any sorting category) for the March meeting is **December 1, 2004**.

In addition to these focus topics, GMAG will organize three Invited Symposia for the March meeting. Co-sponsoring symposia with another Division of APS can allow us to increase this number. This year's GMAG Program Chair (as Chair-Elect of GMAG) is Jack Bass. Please contact Jack at *bass@pa.msu.edu* no later than **Sept. 3, 2004** with nominations for Invited Symposia. In addition to a brief justification, a symposium nomination should include a proposed Chair and three to five proposed speakers, each with a proposed title and brief support note. The stronger the justification and support notes, the better the chance of success.

NOMINATIONS FOR APS FELLOWSHIPS AND PRIZES/AWARDS

GMAG nominates 2-3 people for APS Fellowship each year (approximately 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 young (or not so young!) person you think should be awarded APS Fellowship. The nomination deadline for most of the 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

(awards and prizes are listed on the APS web site <http://www.aps.org/praw/>).

NOTA BENE: We are sad to report that a young and very talented member of GMAG, Dongqi Li of Argonne National Laboratory, sustained serious injuries in a car accident earlier this year. Dongqi's recovery is expected to be challenging for her and her family. We send Dongqi's family our most heartfelt wishes for a complete and rapid recovery.

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 increasing 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 lowdimensional 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.

Organizers:

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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

Focus Topics continued from page 3

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.

Organizers:

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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.

Organizers:

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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.

Organizers:

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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).

North American Perpendicular Magnetic Recording Conference (NAPMRC)

Boulder, CO
Aug 10, 2004
www.napmrc.org

15th Annual Magnetic Recording Conference (TMRC): Media

Boulder, CO
Aug 11-13, 2004
www.iist.scu.edu/TMRC2004_Call.pdf

L10 Ordered Intermetallic and Related Phases for Permanent Magnet and Recording Applications

Copper Mountain, Colorado
August 15 - 20, 2004
info@eci.poly.edu

Ninth International Conference on Ferrites (ICF-9)

Cathedral Hill Hotel, San Francisco, California
August 23 - 27, 2004
[Christine Schnitzer *cschnitzer@acers.org*](mailto:Christine.Schnitzer@acers.org)

Joint European Magnetic Symposia (JEMS '04)

Dresden Germany
September 5 - 10, 2004
www.ifw-dresden.de/imw/jems04/

DISKCON USA 2004

Santa Clara Convention Center/Westin Hotel
Santa Clara, California
September 20 - 22, 2004
www.idema.org/i4a/pages/index.cfm?pageid=3434

2004 Asia-Pacific Data Storage Conference (APDSC '04)

Taoyuan, Taiwan
September 27 - 30, 2004
www.ieo.ntnu.edu.tw/apdsc04/index.htm

International Conference on Molecule-Based Magnets

Tsukuba, Japan
October 4-8, 2004
<http://icmm.chem.nagoya-u.ac.jp/>

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

Please hand this to a colleague interested in Magnetism and its Applications

Join GMAG Today YOUR Group Needs You!

The American Physical Society Topical Group on Magnetism and its Applications, or GMAG, represents **one of the fastest-growing scientific sectors** of the APS. At the 2004 APS March Meeting over 720 (11.6%) of the submitted abstracts were associated with Magnetism.

Membership in GMAG — **an annual investment of only \$7 for APS members** (free for students) — not only helps you keep up with the fast-paced field of Magnetism but also provides the following benefits:

- **The Quarterly GMAG newsletter, with GMAG news and magnetism science focus articles;**
- **Eligibility for GMAG graduate student awards and sponsorships;**
- **Potential to increase the number of APS Fellows sponsored by GMAG;**
- **Potential to increase the number of invited talks on Magnetism at the March Meeting;**
- **The opportunity to help shape the future of Physics in the U.S. by participating in GMAG-sponsored student outreach activities and Congressional visitations.**

Most importantly, membership in GMAG helps the growth and organization of the magnetism community – *your community* – within the American Physical Society. Membership in GMAG gives you a voice to shape and enhance the magnetism community through your GMAG representatives and your participation in annual membership meetings.

For more information, please visit our website at: <http://www.aps.org/units/gmag/index.cfm> or contact any member of our GMAG Executive Committee (listed on page 2).

HERE'S HOW YOU JOIN:

Go to the APS page for "Application to add units" (<http://www.aps.org/memb/unitapp.html>) and follow the easy instructions for adding a unit to your existing membership. Or call the APS at 301-209-3280 and tell one of the Membership Representatives that you want to join the topical group. Remember, students can join for free (see instructions on page 1)

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