GMAG NEWSLETTER

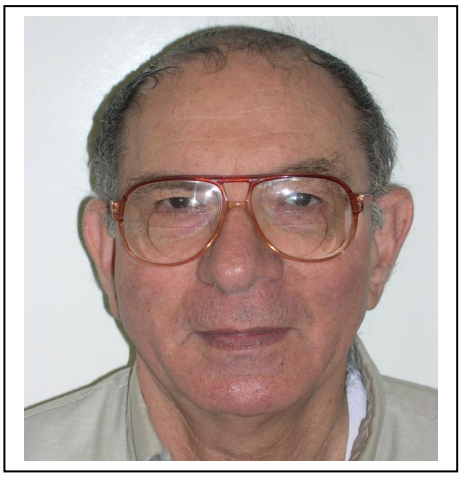
Topical Group on Magnetism and its Applications A Focused Group within the American Physical Society.
No. 21, July 2005

A Note from the Chair

Dear GMAG members,

This issue of the GMAG newsletter invites you to participate in several GMAG activities. We ask you to:

(1) Recommend invited talks and invited symposia for the 2006 March meeting in Baltimore;
(2) Nominate candidates for the GMAG Board
(3) Recommend students for free membership in GMAG and to nominate students for GMAG outstanding Dissertation in Magnetism Awards;
(4) Contribute pictures to the new 'Magnetism Images' section of the GMAG web page,
(5) Nominate candidates for APS Fellowship and APS Prizes.
(6) Propose magnetism-related Outreach projects.
(7) Suggest other activities for GMAG to consider to better serve its members.
(8) Ask your colleagues to join GMAG—only $7/year. A larger membership provides more impact on activities of importance to you, our members.



Details on how to participate are given below. Thanks in advance to those who do so.
Jack Bass

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(1) March Meeting 2006: Nominations for Symposia and Focus Session Invitees:

For the 2006 March Meeting in Baltimore, Chair-elect, Jim Rhyne, is in charge of GMAG-sponsored: (a) Invited Symposia, which consist entirely of invited speakers (usually five), and (b) Focus Session Topics, which involve mostly contributed talks, with one invited speaker per session to provide context.

(a) GMAG is allowed to be lead organizer for three Symposia. ***For each Symposium, we need nominations of topic, chair, and speakers. Please send these to Jim at rhyne@lanl.gov no later than August 31, 2005.***

(b) This year we are co-organizing, with DMP and/or DCOMP and FIAP, six Focus Session topics (abstracts and organizers are given at the end of this newsletter):

- *6.11.1 Theory and Simulation of Magnetism and Spin Dependent Properties*
- *6.11.2 Nanostructured Magnetic Materials*
- *6.11.3 Complex Multifunctional Oxides*
- *6.11.4 Spin Transport and Magnetization Dynamics in Metal-Based Systems*
- *6.11.5 Spin-Dependent Phenomena in Semiconductors*
- *6.11.6 Nanoscale Magnetic Materials for Information Recording and Storage.*

Use http://www.aps.org/units/dmp/invited.cfm to nominate invited speakers for focus sessions shared with DMP. Or else contact the organizers listed at the end of this newsletter and provide them with appropriate justification following APS procedures. The deadline for suggesting invited speakers to focus session organizers is Aug. 31, 2005.

Contributed talks for the focus sessions need to be submitted directly to APS at **http://abstracts.aps.org/** following their procedures. The March Meeting deadline for abstracts is ***Nov. 30, 2005***. Please indicate the appropriate focus session.

(2) GMAG Board Nominations.

Nominations for GMAG offices should be sent to Andy Kent at andy.kent@nyu.edu by Sept. 1, 2005. Nominations are needed for Vice Chair (who becomes Chair-Elect, Chair, and Past Chair), and 2 new Members-at-Large for the Executive Committee.

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(3) Student Membership and Awards:

To encourage graduate students working in magnetism, GMAG is continuing two policies begun a few years ago:

a) 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 membership chair, Jeff Childress (Jeff.Childress@hitachigst.edu) 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).***

b) Outstanding Dissertation in Magnetism Awards: GMAG will present up to three dissertation awards at the next March Meeting. These awards will recognize students who have conducted outstanding research leading to their dissertation and will consist of an invited talk in an appropriate session at the March APS Meeting, a $500 prize to the student, and up to $250 toward his/her travel expenses to the March meeting. The student must be in the final year before graduating with a Ph.D., and both the student and the advisor must be current members of GMAG. Nominations will consist of: a nominating letter; an extended abstract of the research; the student's CV and publication list; and contact information for the student, all submitted by the student's advisor or another senior researcher who knows the student's work well. 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 after Sept. 1, 2005 but before Sept. 1, 2006 to be eligible for the 2006 March Meeting);
- assessment of the student's future potential as a research scientist.

Nominations should be sent by email as a single pdf file to Jack Bass (bass@pa.msu.edu) by Sept. 1, 2005. Evaluation of the nominations will be conducted by part or all of the GMAG Executive Committee.

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(4) 'Magnetism Images' section of the GMAG Web Page.

The GMAG web now has a new section entitled 'Magnetism Images'. This section is subdivided into six sections: (a) Magnetism, Fundamental Science; (b) Magnetism on Earth and in the Universe: (c) Magnetism in Industry; (d) Magnetism Education; (e) Magnetism-related Web Sites; and (f) Magnetism-related Books. Clicking on a section will bring up a list of figure captions, and clicking on a caption will bring up a figure. The intent is to make these figures available (with proper attribution) for private use and, perhaps, for magnetism-related brochures to be prepared by GMAG. If the Web site grows as we hope, the sections will have to be subdivided, and probably revised to reflect their contents and make those contents accessible. ***If you are interested in helping to organize and 'fill' this section, please contact Jack Bass (bass@pa.msu.edu).***

(5) Nominations for APS Fellowship and Prizes/Awards.

The nominations deadlines for this year have passed, but it is not too soon to start thinking about next year. GMAG nominates 2-3 people for APS Fellowship each year. The next nomination deadline is **April 1, 2006**. Information can be found at **http:www.aps.org/fellowship/. Nominations** for most APS prizes are due by **July 1, 2006. See http://www.aps.org/praw/.**

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(6) Outreach Funding from GMAG.

Since last year, GMAG has invited applications from its members to support outreach activities involving magnetism. Limited funds (up to $2500 per project) are available to cover supplies and expenses associated with activities that 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, Jack Bass, at bass@pa.msu.edu.*** The GMAG Executive Board will review proposals on an ongoing basis.

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(7) Suggestions for Other Activities for GMAG to Undertake.

Send these to Jack Bass (bass@pa.msu.edu).

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(8) Ask your colleagues to Join GMAG.

For only $7 for APS Members (students free) GMAG Membership confers these benefits:

The Quarterly GMAG newsletter.

Eligibility for GMAG graduate student awards and sponsorship.

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.

Opportunity to help shape the voice and future of the Magnetism Community (your community) in the USA.

For more info. See the GMAG website: http://www.aps.org/units/gmag/index.cfm.

TO JOIN: Go to the APS page for "Application to add units" (http://www.aps.org/memb/unitapp.html) and follow the instructions for adding a unit to your membership. Or call the APS at 301-209-3280 and tell a Membership Representative that you want to join topical group GMAG.

Magnetism conferences and workshops: for updates, see GMAG website
http://www.aps.org/units/gmag/index.cfm.

The 16th Magnetic Recording Conference (TMRC 2005) (Stanford Univ., Stanford, CA, August 15-17, 2005) (http://tmrc.nanointernational.org)

50th Conference on Magnetism and Magnetic Materials (MMM05) (San Jose, CA, Oct. 30 – Nov. 3, 2005) (www.magnetism.org). Submission Deadlines are past. Online registration website opens Aug. 1, 2005. .

Materials Research Society (MRS) 2005 Fall Meeting (Boston, Mass., Nov. 28-Dec. 2, 2005) (www.mrs.org).

Seventh Latin American Workshop on Magnetism, Magnetic Materials and their Applications (Renata, Chile, Dec. 11-15, 2005) (http://www.law3m.cl/Law3m/index.htm)

6th International Conference on the Scientific and Clinical Applications of Magnetic Carriers (Krems, Austria—Vienna region, May 17-20, 2006) http://www.magneticmicrosphere.com

10th Joint MMM/Intermag Conference (Baltimore, Maryland, January 7-11, 2007)

Again, we invite and encourage you to participate in the GMAG activities described above.

The GMAG Executive Committee

Chair: Jack Bass (bass@pa.msu.edu)
Chair-Elect: Jim Rhyne (rhyne@lanl.gov)--Program Committee Chair.
Vice-Chair: Daniel Reich (reich@jhu.edu)--Fellowship Committee Chair.
Past Chair: Peter Schiffer (schiffer@phys.psu.edu)
Secretary-Treasurer: Caroline Ross (caross@mit.edu)
Executive Committee Members-at-Large (term ends March xxxx of the year shown):
Jeff Childress (jeff.childress@hgst.com) (2007)—Membership Chair,
Andrew Kent (andy.kent@nyu.edu) (2007)—Nominating Committee Chair,
Chris Leighton (leighton@tc.umn.edu) (2008),
Laura Lewis (lhlewis@bnl.gov) (2006),
Sara Majetich (sm70@andrew.cmu.edu) (2008),
Mark Stiles (mark.stiles@nist.gov) (2006)

Focus Topics for March 2006

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 semiconductors, 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.

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6.11.2 Nanostructured Magnetic Materials (DMP/GMAG)

This session focuses on magnetic materials and phenomena at the nanometer-scale. Magnetic nanostructures include films, multilayers, nanocomposites, hybrid structures, wedges, nanowires, magnetic point contacts, nanoparticles, nanoparticle arrays, and patterned films. This session will cover both 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 is 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 Complex Multifunctional Oxides (DMP/GMAG)

The broad range of functionalities associated with solid oxides results in large part from the complexity of their electronic structures, and the close competition they exhibit between multiple magnetic and electronic phases. These factors can lead to large responses to external stimuli and the occurrence of striking phenomena such as colossal magnetoresistance and giant magnetoelectric or magnetocalorimetric effects. This symposium will explore recent advances in the fundamental physics and potential technological applications of such complex and multifunctional oxide materials. Sessions will focus both on phenomena of current interest, such as colossal magnetoresistance, multiferroic behavior, magnetoelectronic phase separation, and orbital and charge ordering, as well as specific materials classes that are receiving increased attention, including manganites, cobalt oxides (perovskites and the sodium cobaltates), and ruthenates. The interplay between bulk and thin film synthesis, characterization of structural, electronic and physical properties, and theory and simulation, will be emphasized.

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

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. 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), 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, spin-current-driven domain wall dynamics, and studies in ferromagnetic - normal metal and ferromagnetic - superconductor systems. Studies that emphasize spin phenomena in semiconductor systems will be covered in a separate focus session.

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

Recent advances in understanding the physics of spin-dependent phenomena in semiconductors have come from the mutual influence of research on fundamental optical and transport properties, materials physics, and devices. This focused session solicits abstracts that explore a fundamental understanding of spin-dependent processes in magnetic and non-magnetic structures incorporating semiconductors. Topics include 1) spin dynamics and transport in nonmagnetic semiconductors, including spin transport in mesoscopic systems, electrical or optical spin injection, manipulation, and detection, optical and electronic control of spin coherence, and hyperfine effects; 2) growth, characterization, electrical, optical and magnetic properties, and control of magnetic properties in ferromagnetic semiconductors and hybrid ferromagnet-semiconductor structures and devices; and 3) developments in related fields, such as organic semiconductors and quantum computing, that relate to spin-dependent phenomena in semiconductors.

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6.11.6 Nanoscale Magnetic Materials for Information Recording and Storage (GMAG/FIAP)

This session focuses on nanoscale magnetic materials for information recording and storage applications, one of the most advanced and rapidly developing fields of magnetism today. Recent technological advances have brought this field to a point where fundamental physical properties such as stability (super-paramagnetic effect) and speed (intrinsic and extrinsic damping) have reached crucial significance, and materials fabrication technologies have become most challenging. Simultaneously, novel technologies like perpendicular recording, patterned media and thermally assisted recording are emerging in this field.

The session covers materials intended to advance storage applications, their magnetic properties and characterization techniques, including magnetic reversal for high-speed switching, and theoretical descriptions and modeling of materials and processes. Novel recording materials of interest include: thin and ultrathin films, multilayers, nanoparticles, cluster-assembled nanocomposites and other nano-assemblies, as well as lithographically defined nanostructures. Applied and technological topics include conventional and emerging information-storage applications.

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