GMAG NEWSLETTER - JULY 2006

A Note From the Chair:

Summer is an active time for planning the next APS March Meeting. In particular this is the time we can have input to the GMAG portion of the program by suggesting invited speakers for focus sessions and by volunteering to organize one of the three GMAG symposia. Because magnetism papers have become a significant and influential part of the March meeting, we urge you to help in formulating the program. Aside from the March meeting, GMAG also encourages nominations for APS fellows, for Ph.D. student Dissertation Awards, and for members of the GMAG Executive Committee. Deadlines and further information on these and other opportunities to assist GMAG and the physics community are given in the following pages of this newsletter.

We always welcome suggestions for new activities and programs you would like to see GMAG initiate. Please send ideas to me or one of the other GMAG officers. Lastly, please bring the Topical Group on Magnetism (GMAG) to the attention of your colleagues and urge them to join. The cost is only $7 per year and students are free the first year.

Jim Rhyne, GMAG Chair

GMAG Officers and Executive Committee Members:

Chair: Jim Rhyne (rhyne@lanl.gov)
Chair-Elect: Daniel Reich (reich@jhu.edu)
Vice-Chair: William Butler (wbutler@mint.ua.edu)
Past Chair: Jack Bass (bass@pa.msu.edu)
Secretary-Treasurer: Caroline Ross (caross@mit.edu)
Executive Committee Members-at-Large: Jeff Childress, Andrew Kent, Chris Leighton, Sara Majetich, David Lederman, and Stephen Hill.

March Meeting Program

The Chair-Elect, Dan Reich (reich@jhu.edu), is the GMAG program chair for the 2007 March Meeting in Denver. He is coordinating the organization of both GMAG sponsored (or co-sponsored) Focus Topics and the GMAG invited symposia.

Focus Topics – Nominations for invited speakers

For the 2007 meeting, GMAG is co-sponsoring seven focus topics. Each focus topic consists of multiple sessions of contributed talks on a common theme. Each session can also include one invited talk. Suggestions for invited speakers are welcome and should be sent to one of the organizers of the focus topic (see below) **before August 31, 2006**. Contributed talks relating to a focus topic should be submitted under the focus topic sorting category (number given below) and not to a general category. The deadline for contributed talks is November 20, 2006, and are submitted on the web at http://abs.aps.org. The GMAG focus topics (co-sponsors are shown in parenthesis) for 2007 are:

6.11.1 *Theory and Simulation of Spin-Dependent Effects and Properties* (DCOMP/DMP/GMAG) – organized by Oleg Mryasov (oleg.mryasov@seagate.com) and Qian Niu (niu@physics.utexas.edu)

6.11.2 *Magnetic Nanostructures: Materials and Phenomena* (DMP/GMAG) – organized by Srikanth Hariharan (sharihar@cas.usf.edu) and Andrew Kent (andy.kent@nyu.edu)

6.11.3 *Complex Oxides* (DMP/GMAG) – organized by Valery Kiryukhin (vkir@physics.rutgers.edu), Warren Pickett (wepickett@ucdavis.edu), and Tsuyoshi Kimura (kimura@lucent.com).

6.11.4 *Spin Transport and Magnetization Dynamics in Metal-Based Systems* (GMAG/DMP/FIAP) – organized by Axel Hoffmann (hoffmann@anl.gov) and Jonathan Z. Sun (jonsun@us.ibm.com_

6.11.5 *Spin-Dependent Phenomena in Semiconductors* (GMAG/DMP/FIAP) – organized by Igor Zutic (zigor@buffalo.edu), Nitin Samarth (nsamarth@phys.psu.edu), and Tomasz Dietl (dietl@ifpan.edu.pl)

6.11.6 *Nanomagnetic Particles and Structures for Information Storage Applications* (GMAG/FIAP) – organized by Shouheng Sun (ssun@brown.edu) and Eric Fullerton (eric.fullerton@HitachiGST.com)

6.11.7 *Frustrated and Low Dimensional Magnetism* (GMAG) – organized by Collin Broholm (broholm@jhu.edu) and Shivaji L. Sondhi (sondhi@princeton.edu)

Descriptions of these focus topics are found on page 5 of this newsletter.

GMAG Symposia – Suggestions for topics

GMAG is the sponsor of three invited symposia for the March Meeting. GMAG members are encouraged to recommend topics for these symposia. The nomination should include the names of the organizer(s) and a tentative list of invited speakers (usually 5 per session). Please send nominations to the GMAG program chair, Dan Reich (reich@jhu.edu), **before August 31, 2006.**

Nominations for GMAG Officers and members of the Executive Committee.

Each year GMAG requests nominations for Vice-Chair (who succeeds to Chair-Elect, Chair, and Past Chair) and for two new at-large members of the Executive Committee. Nominations for these positions should be sent to Sara Majetich (sm70@andrew.cmu.edu), chair of the Nominating Committee, **before September 1, 2006.**

Nominations for APS Fellowship and Prizes/Awards

The nominations deadlines for APS fellowship and most prizes have passed for this year. However, it is a good time to consider nominations for next year. GMAG nominates 2-3 people for APS Fellowship each year. The next deadline is April 1, 2007 and nominations should be made on-line at **http:www.aps.org/fellowship/**. APS prize descriptions and nomination deadlines are at **http://www.aps.org/praw/.**

Student Dissertation Awards and GMAG Membership

To encourage graduate students working in magnetism, GMAG annually grants up to three awards to recognize outstanding graduate level research leading to a Ph.D degree. These Dissertation Awards carry a $500 prize for the student, an invitation to present an invited paper in the March meeting, and up to $250 additional travel expenses to attend the meeting. The student must be in his/her final year of graduate school, and **both** the student and the advisor must be current members of GMAG. Nomination packets need to include (a) a nominating letter, (b) an extended abstract of the Ph.D. research, (c) the student's CV including a full publication list and contact information for the student.

Nominations must be made by the student's advisor or another senior researcher who is very familiar with the student's abilities and research work. 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, 2006 but before Sept. 1, 2007 to be eligible for the 2007 March Meeting);
- assessment of the student's future potential as a research scientist.

Nominations for student Dissertation Awards should be sent by email as a single pdf file to Jim Rhyne (rhyne@lanl.gov) by Sept. 1, 2006. Evaluation of the nominations will be conducted by the GMAG Executive Committee.

Free first-year 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) for one year. ***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).***

'Magnetism Images' section of the GMAG Web Page

The GMAG web now has a section entitled 'Magnetism Images' **http://positron2.aps.org/units/gmag/brochure/index.cfm.** 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).***

Outreach Funding from GMAG

GMAG invites 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, Jim Rhyne at (rhyne@lanl.gov).*** The GMAG Executive Board will review proposals on an ongoing basis.

Reminder -- Ask your colleagues to Join GMAG

For only $7 additional dues APS members can become GMAG Members with the following benefits (students are free for one year.)

- 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 information 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.

Descriptions of GMAG Sponsored/cosponsored Focus Topics
March 2007 APS Meeting

6.11.1 Theory and Simulation of Spin-Dependent Effects and Properties (DCOMP/DMP/GMAG)
This focus topic centers on recent advances in the theory and simulation of spin dependent properties including spin transport and dynamic magnetization processes, exchange coupling, spin relaxation and other spin-orbital polarization induced effects. We encourage contributions emphasizing new levels of understanding and/or predictions of spin transport effects (spin momentum transfer, anomalous Hall and Nernst effects, finite bias transport) and magnetic properties of nano-magnets (reduced dimension systems ranging from 0D-nano-particles to 1D and 2D materials such as nano-wires and interfaces) including spin and orbital polarization induced effects. Methods include materials specific modeling approaches based on *ab-initio* techniques (including methods going beyond LDA) and approaches to couple these methods with methods suitable to larger scale systems in order to bridge various length and time scales. The approaches and topics might include, but are not limited to, atomic scale effective spin Hamiltonians, Monte-Carlo, Langevin dynamics, micro-magnetic and hybrid modeling for proximity effects, interlayer magnetic coupling, exchange spring, exchange bias, magnetic quantum confinement, hysteresis modeling, and other spin dependent phenomena. We especially encourage contributions showing benefits of cross-coupling between theoretical and computational methods for topics such as the Berry phase, topology, DMFT, statistical coarse-graining, Wannier functions and large-scale DFT techniques for explaining and/or predicting specific experimental results and materials systems.

6.11.2 Magnetic Nanostructures: Materials and Phenomena (DMP/GMAG)
This topic focuses on magnetic materials and phenomena at the nanometer-scale. Magnetic nanostructures include thin films, multilayers, nanoparticles, nanowires, nanorings, nanocomposites, core-shell structures, hybrid structures, magnetic point contacts and self-assembled as well as patterned magnetic arrays. 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, glassy dynamics, memory effect and other relaxation phenomena, inter-particle interactions, effects of structural disorder, modeling of hysteresis, thermal and quantum fluctuations, and other nanoscale magnetic phenomena. Of special interest is the

fabrication of nanostructures with atomic-scale control using physical and chemical methods, self and directed assembly of nanostructure 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.

6.11.3 Complex oxides (DMP/GMAG)
This topic will explore recent advances in the fundamental physics and potential technological applications of complex oxide materials. Various intriguing phenomena associated with structural, magnetic, and electronic properties of transition-metal oxides results in large part from the complexity of their electronic structures and the close competition of multiple interactions. Fine-tuning of these factors can lead to large responses to external stimuli and the occurrence of striking phenomena. Sessions will focus on phenomena of current interest, such as colossal magnetoresistance, multiferroic behavior, electronic 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. Both theoretical and experimental papers on complex oxides in bulk, thin-film, artificial-superlattice, and interface form are encouraged.

6.11.4 Spin Transport and Magnetization Dynamics in Metal-Based Systems (GMAG/DMP/FIAP)
This session will focus on experimental and theoretical investigations that elucidate and/or utilize the transport and transfer of spin, as well as magnetization dynamics, 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. Furthermore, a main focus will be magnetization dynamics in confined geometries investigated both in the time and frequency domain. Also of particular interest are studies of the interplay between non-equilibrium carriers and magnetization dynamics in magnetic nanostructures. Additional topics include, but are not limited to, spin-charge-separation in transport processes including spin-diffusion and spin-relaxation, interfacial spin transport, spin injection and detection, mechanisms for magnetic damping, especially in magnetic nanostructures, spin-current-driven magnetization and 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.

6.11.5 Spin-Dependent Phenomena in Semiconductors (GMAG/DMP/FIAP)
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 focus topic solicits abstracts that explore a fundamental understanding of spin-dependent processes in magnetic and non-magnetic structures incorporating semiconductors. Topics include 1) spin transport and dynamics 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 quantum dots, nanocrystals, nanowires, organic semiconductors, and quantum computing, that relate to spin-dependent phenomena in semiconductors.

6.11.6 Nanomagnetic Particles and Structures for Information Storage Applications (GMAG/FIAP) -- [cross-listed as 16.12.11]

This Topic focuses on nanoscale magnetic materials for information recording and memory applications. 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) reach crucial significance, and materials fabrication technologies become most challenging. Simultaneously, novel technologies like perpendicular recording, patterned media, thermally assisted recording and magnetic random access memory are emerging in this field.

This Topic 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 and memory applications.

6.11.7 Frustrated and Low Dimensional Magnetism (GMAG)

There is a robust framework for describing the low temperature structures, phase transitions, and excitations of conventional three dimensional magnetic materials. However, when fluctuations are enhanced by low dimensionality or competing interactions, qualitatively new behavior can emerge. This is best established in one dimension where controlled theory and experiment have uncovered phases that lack long range magnetic order and exhibit fractional quantum numbers. Competing interactions can also produce novel magnetic phases in higher dimensions including valence bond solids and various forms of spin liquids. This Focus Topic solicits abstracts for presentations that explore both theoretical and experimental aspects of the field. Topics of interest include: one dimensional quantum magnetism, geometrical frustration and cooperative paramagnetism, order by disorder, spin ice, the role of magnetoelastic coupling, frustration induced spin liquid phases and topological order, quantum critical two dimensional spin systems, magnon Bose condensation. Also of interest are the effects of strongly fluctuating spins on properties beyond magnetism including transport, thermal transport and ferroelectricity.

Upcoming magnetism conferences and workshops

See the GMAG website **http://www.aps.org/units/gmag/index.cfm.** for updates on conferences and workshops of interest to GMAG members

19th International Colloquium on Magnetic Films and Surfaces (ICMFS 2006)
August 15 - 18, 2006, Sendai, Japan , http://icmfs2006.apph.tohoku.ac.jp/

International Conference on Magnetism (ICM2006)
August 20-25, 2006, Kyoto, Japan, http://icm2006.com/

Gordon Conference: Magnetic Nanostructures
September 3-8, 2006, The Queen's College, Oxford, UK, http://www.grc.org/programs/2006/magnano.htm

Workshop on Current trends in Nanoscopic and Mesoscopic Magnetism
September 6-9, 2006, Santorini, Greece
http://www.ims.demokritos.gr/SANTORINI_WORKSHOP/

10th Joint MMM/Intermag Conference, January 7-11, 2007 , Baltimore, Maryland, www.magnetism.org .

Materials Research Society (MRS) 2006 Fall Meeting, Boston, Massachusetts, November 27 - December 1, 2006, www.mrs.org

APS 2007 March Meeting, March 5-9, 2007, Denver, CO, www.aps.org

52nd Conference on Magnetism and Magnetic Materials, November 5-9, 2007, Tampa, FL,