No. 40

GMAG NEWSLETTER

August 2013

Topical Group on Magnetism and its Applications

units.aps.org/units/gmag/

Note from the Chair

Greetings from GMAG! We have already begun planning the magnetism portion of the 2014 APS March Meeting, which will be held in Denver, Colorado, from March 3 – 7, 2014. This newsletter contains information on

- *Planning for the March Meeting and **how you can be involved**, including suggesting invited speakers in focus topic sessions (there are eight magnetism related focus topics sessions planned) and symposium proposals (GMAG sponsors up to five symposia). Note that the deadline for these suggestions is **September 9, 2013**.*
- *Nominating officers for GMAG.*
- *Ph.D. student dissertation awards.*
- *March Meeting student travel awards.*
- *Funding available from GMAG for outreach activities.*

Further information for these and other opportunities to assist GMAG 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 feel free to contact me or any member of the GMAG executive committee with your ideas. I encourage you to actively participate in planning the March Meeting and in GMAG's activities.

Thanks for being involved with GMAG and please do not hesitate to get actively involved in the many activities described below.

-Mark Stiles, GMAG Chair, mark.stiles@nist.gov

Important Deadlines

Date	Reason	Contact
September 9	Symposia Nominations for March Meeting	Yves Idzerda/idzerda@physics.montana.edu
September 9	Invited speaker suggestions for focus topics	Focus Topic Organizers
September 30	Officer and Executive Committee nominations	William Ratcliff/william.ratcliff@nist.gov
October 10	Dissertation Award Nomination	GMAG Chair (Mark Stiles)/gmagchair@aps.org
November 8	March Meeting Abstracts	http://www.aps.org/meetings/march/
December 1	March Meeting Student Travel Grants	Jonathan Sun/jonsun@us.ibm.com
ongoing	Outreach Proposals	GMAG Chair (Mark Stiles)/gmagchair@aps.org

March Meeting Program

Yves Idzerda (idzerda@physics.montana.edu), the Chair-Elect of GMAG, is the Program Chair for the 2014 March Meeting in Denver Colorado. He is coordinating the organization of both GMAG sponsored (or co-sponsored) Focus Topics and the GMAG invited symposia. Note that suggestions of invited speakers for focus topics and symposia are welcome before the deadline of **September 9, 2013**. The deadline for submission of meeting abstracts is **November 8, 2013.**

Focus Topics-Nominations for invited speakers

For the 2014 meeting, GMAG is co-sponsoring eight focus topics. Each focus topic consists of multiple sessions of contributed talks based on a common theme. Each session can also include one invited talk. Suggestions for invited speakers are welcome and should be sent by email to one of the organizers of the focus topic (see below) or submitted to the APS website before September 9, 2013. The APS website is http://meetings.aps.org/aps_invited/Invited/LoginForm.cfm?MT=MAR14&UNIT=GMAG. Contributed talks relating to a focus topic should be submitted under the focus topic sorting category (number given below). The GMAG focus topics, organizers, and detailed descriptions for 2014 follow at the end of this newsletter.

Nominations for GMAG Symposia

GMAG may sponsor up to five invited symposia at the March Meeting. GMAG members are encouraged to recommend topics for these symposia, each of which includes five speakers. Please upload your symposium at the APS nomination website (http://meetings.aps.org/aps_invited/Invited/LoginForm.cfm?MT=MAR14&UNIT=GMAG) or send your nominations to the GMAG program chair, Yves Idzerda (Idzerda@montana.edu) before September 9, 2013. A nomination should consist of a single file and should include: (1) Nomi-

nator's name and contact information; (2) Suggested title of the symposium; (3) A paragraph describing the theme of the symposium and its justification; (4) A list of 5 speakers with the following for each: (a) full contact information, (b) a tentative title, (c) a brief description and justification, including references where available; (5) names and contacts of one or two potential back-up speakers.

Submission of a complete nomination package is essential for the review process, which is quite competitive. Every year there are 10-15 nominations for the five GMAG-symposia. The justification and breadth of interest of the symposium are important to a successful proposal.

Please note that APS rules do not allow speakers to give invited talks at consecutive March meetings, and there is a searchable index of invited talks at the 2013 meeting available at http://meeting.aps.org/Meeting/MAR13/APS_Invited.

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. In addition the three-year term of the Secretary/Treasurer is ending in 2014. Nominations for these positions should be sent to William Ratcliff (william.ratcliff@nist.gov), chair of the GMAG Nominating Committee, before September 30, 2013.

Nomination for GMAG Student Dissertation Awards

In order to encourage students working in magnetism, every year GMAG sponsors Outstanding Dissertation in Magnetism Awards. GMAG will present up to three dissertation awards at the next APS 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 APS March Meeting, a $500 prize to the student, and up to $250 toward his/her travel expenses to the APS 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:

- Quality and independence of the student's work
- Student's speaking ability
- Year the student began graduate school
- Student expected completion date (must be after September 1, 2013, but before September 1, 2014 to be eligible for the 2014 APS 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 the GMAG Chair (gmagchair@aps.org) by October 10, 2014. Evaluation of the nominations will be conducted by the GMAG Executive Committee.

The 2013 recipients of the GMAG Dissertation Award were

Azure Avery, University of Denver
The Planar Nernst and Seebeck Effects in Ferromagnetic Metal Films with In-Plane Thermal Gradients

Aaron Chen, Ohio State University
Dynamic Magnetic Traps for Particle Self-Assembly and Lab-on-Chip Applications

Michael Quinsat, CEA Leti/Spintec
Experimental Characterization of Non-isochronous Properties of Spin Torque Nano-oscillators

GMAG Student Travel Award

To increase student participation and involvement in activities essential to GMAG and APS as a whole, GMAG will sponsor ten Student Travel Awards for the March Meeting. The award will consist of $250 in travel assistance to attend the meeting. The student is expected to attend the GMAG business meeting and serve one shift at the "Contact Congress" booth to support the APS outreach for congressional support for scientific research. The student must be a presenter at the March Meeting, and should submit an application, which can be downloaded from the GMAG website (http://www.aps.org/units/gmag/) after September 1, by email to Jonathan Sun (jonsun@us.ibm.com) by **December 1, 2013**.

Request for Magnetism Outreach Proposals

The topical group on Magnetism (GMAG) invites proposals directed towards educating nonscientists and the general public about the role of magnetism. Funds (up to $5000 per project, although larger proposals may be considered) are available to cover supplies and expenses associated with activities that aim to educate non-scientists about magnetism and its applications. These grants are to foster new activities and not meant to support ongoing programs. Examples of outreach activities include (but are NOT limited to) the development of magnetism kits that may be used at elementary schools and / or at museums and other public places, the development of a high school lab on magnetism, or the production of a video on magnetism that would appeal to the general public. Preference will be given to innovative activities that will be documented so that they can be reproduced elsewhere. GMAG will disseminate the outcome of the activities to the GMAG membership through the GMAG Newsletter and to the broader magnetism community through the GMAG website; the proposers are encouraged to consider alternate avenues for dissemination, this should include presentation of the results at an APS meeting. The GMAG Executive Board will review proposals on an ongoing basis. Although partnership with a GMAG member is encouraged, all applications for projects related to outreach in magnetism will be considered. The GMAG executive board can assist in identifying potential partners for outreach proposals submitted by non-members.

Application Process

To apply for these funds, please submit the following information as one PDF file to the GMAG Chair (gmagchair@aps.org):

- Cover sheet clearly stating the name, address, phone number, and email of the main contact person for your application. Please include the name of your program, and, if affiliated with an institution, the department and institution you represent.
- One page CV for main contact person.
- Narrative description (no more than two pages) of your program. Please include a description of the proposed activity or activities, the anticipated impact and the process of documentation to enable reproduction of the activity, details of other financial support (if any), and description of personnel working on the program (instructional lab technicians, students, professors, etc).
- Rough budget detailing your plans for utilizing the funds.
- Letter of support from your department chair or similar administrative official (this can be sent separately, as long as it clearly identifies the main contact person and institution).
- Tax ID number or Employee ID number if part of an organization, Social Security Number if an individual. For Universities, the organizational tax ID number can be obtained from the grants and contracts department.

Important Information

These funds cannot be used for salaries, stipends, etc. of the main participants, but can be used to hire a student, an intern, or professional services if that is essential for the project. An APS statement on indirect costs is available at http://www.aps.org/programs/outreach/upload/rfp-indirectcosts12.pdf.

Ask your Colleagues to Join GMAG

For only $8 additional dues APS members can become GMAG Members with these benefits (students are free for one year):

- GMAG newsletter.
- Eligibility for GMAG graduate student awards and sponsorship.
- Potential to increase the number of APS Fellows sponsored by GMAG.
- Potentiatl 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 US.

See the GMAG website: http://www.aps.org/units/gmag. TO JOIN: Go to the APS page for "Membership Units" (http://www.aps.org/membership/units/join-unit.cfm) and follow 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.

GMAG Focus Topic Descriptions and Organizers:

Focus topics and Focus sessions bring new areas of interest and new people to the March meeting. They typically represent an opportunity to explore recent developments in a sub-area of the magnetism sorting categories. These GMAG Focus Topics are cosponsored with the Division of Materials Physics (DMP) and the Forum on Industrial and Applied Physics (FIAP). Note there is some overlap within the focus topic areas as well as with other DMP and GMAG sessions. The organizers of all of the related focus sessions and general sorting categories will share information to appropriately place each submitted abstract and work to make an optimal meeting program.

10.1.1 Magnetic Nanostructures: Materials and Phenomena (GMAG/DMP)

Reduced dimensionality, confinement, and reduced scale often lead to magnetic structures and spin behavior that is markedly different from that of the bulk. This Focus Topic explores the advances in magnetic nanostructures and the novel properties that arise in magnetic materials at the nanoscale. Magnetic nanostructures of interest include thin films, multilayers, superlattices, nanoparticles, nanowires, nanorings, nanocomposite materials, hybrid nanostructures, spin phenomena in nanoscale organics, magnetic point contacts and self-assembled as well as patterned magnetic arrays. Sessions will include talks on the methods used to synthesize such nanostructures, the variety of materials used, and the latest, original theoretical and experimental advances. Synthesis and characterization techniques that demonstrate nano-or atomic-scale control of properties will be featured. Phenomena and properties of interest include: magnetization dynamics, magnetic interactions, magnetic quantum confinement, spin tunneling and spin crossover, proximity and structural disorder effects, strain effects, microwave resonance and microwave assisted reversal, magnetic anisotropy, and thermal and quantum fluctuations.

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10.1.2 Emergent Properties in Bulk Complex Oxides (GMAG/DMP)

The emergence of exotic states of matter from the intricate coupling of the electronic and lattice degrees of freedom is a unique feature in strongly correlated electron systems. This Focus Topic explores the nature of various exotic states observed in bulk specimens of complex oxides and multi-ferroics and their competing interactions, the ways in which the spin, lattice, charge, and orbital degrees of freedom respond on a variety of length scales, and how they interact and compete with each other to produce novel phenomena. It provides a forum

to discuss recent developments and results covering basic aspects (new materials synthesis, experiment, theory and simulation) of bulk systems. Included in this class of materials are the complex oxides of 3-, 4-, and 5-d transition metal compounds that exhibit a wide range of novel physical properties stemming from the complex nature of the competing interactions and nearly degenerate multiple ground states. Associated with this complexity is a tendency for new forms of order such as the formation of stripes, ladders, checkerboards, or phase separation, and an enhanced response to external influences.

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10.1.3 Magnetic Oxide Thin Films and Heterostructures (GMAG/DMP)

Magnetism in complex oxides has long been a rich field of study in condensed matter physics due to the strong interactions between the spin, charge, lattice, and orbital degrees of freedom. When magnetic oxides are prepared in the form of thin films they can exhibit additional effects due to epitaxial strain, reduced dimensionality, interfacial charge transfer, electronic reconstruction, proximity effects, etc. These effects generate exciting new prospects both for discovery of fundamental physics and development of technological applications. This Focus Topic is dedicated to developments in the understanding of the electronic and magnetic properties of oxide thin films, heterostructures, superlattices, and nanostructures, with an emphasis on synthesis, characterization, theoretical modeling, and novel device physics. Specific areas of interest include, but are not limited to, growth of oxide materials, control of their magnetic properties and ordering, magnetotransport, strongly correlated or "Mott" systems, strong spin-orbit coupling effects, and recent developments in theoretical prediction and materials-design approaches. Advances in techniques to probe and image magnetic order in complex oxide thin films (including optical and electron-probes, and neutron/synchrotron-based techniques) are also emphasized. Note that overlap exists with other DMP and GMAG focus sessions. As a rule of thumb, if magnetism plays a key role in the investigation or the properties observed, then the talk is appropriate for this focus topic.

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10.1.4 Spin Transport and Magnetization Dynamics in Metals-Based Systems (GMAG/DMP/FIAP)

Spin-related effects in metals and in ferromagnetic heterostructures are generally robust and observable at room temperature. Discoveries such as giant and tunneling magnetoresistance and spin-transfer torque are moving from discovery to applications rapidly. Fundamental spin-dependent transport physics, novel materials and thin film structures are being actively explored in metallic multilayer-based junctions and magnetic tunnel junctions for deeper understanding and potentially new functional materials and devices. This Focus Topic aims to capture new developments in these areas, including experimental and theoretical aspects of spin transport and magnetization dynamics in mostly metal-based systems, such as ultrathin films, lateral nanostructures, perpendicular nanopillars, and tunnel junctions. In particular, contributions describing new results in the following areas are solicited: (i) The interplay between spin currents and magnetization dynamics in magnetic nanostructures; spin-transfer, spin pumping and related phenomena, including current-induced magnetization dynamics in heterostructures and domain wall motion in magnetic wires; (ii) Theoretical predictions and/or experimental discovery of half-metallic band structures, both in bulk solids and at the surfaces of thin films. Spin transport and magnetization dynamics in magnetic nanostructures (e.g. TMR, CPP-GMR and lateral spin valve structures) based on half-metallic materials; (iii) Effects of spin-orbit interaction on steady-state and dynamic properties of nanostructures including: the (inverse) spin-Hall and anomalous-Hall effects, microscopic mechanisms of magnetization damping, the effects of interface spin-orbit interaction, and spin-orbit interaction as a means for spin-current generation; (iv) Electric field control of magnetic properties (e.g. anisotropy, phase transition, exchange bias,…), including but not limited to: hybrid metals/oxide structures, piezoelectric layer coupled to ferromagnetic films, electrolyte/ferromagnetic systems; (v) Ultrafast magnetization response to (and reversal by) intense laser pulses; magnetization dynamics at elevated temperatures and thermally assisted magnetization reversal; (vi) Thermoelectric spin phenomena such as giant-magneto thermopower and Peltier effects, spin-Seebeck effect, spin and anomalous Nernst and Ettingshausen effects (spin caloritronics); (vii) Thermal gradient and/or RF driven magnonic magnetization dynamics in nanostructures including spin wave excitation, propagation, and detection. Interactions between electronic spin-current and magnon propagations in thin film and device structures; (viii) General considerations of spin-angular momentum current flow, energy flow, and entropy flow, conservation laws and Onsagar-reciprocal relationships.

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10.1.5 Spin Dependent Phenomena in Semiconductors (GMAG/DMP/FIAP)

The field of spin dependent phenomena in semiconductors shows rapid advances as well as challenges in a widening range of new effects and materials systems (e.g. heterostructures, III-Vs, Si and Ge, diamond, graphene and organics), and new structures (e.g. semiconductor quantum structures and nanostructures, wires and carbon nanotubes, hybrid ferromagnetic/semiconductor structures). This Focus Topic solicits contributions aimed at understanding spin dependent processes in magnetic and non-magnetic structures incorporating semiconducting materials. Topics include: (i) electrical and optical spin injection, spin Hall effects, spin dependent topological effects, spin interference, spin filtering, spin lifetime effects, spin dependent scattering, and spin torque; (ii) growth, characterization, electrical, optical and magnetic properties of (ferro-) magnetic semiconductors, nanocomposites, and hybrid ferromagnet/semiconductor structures, including quantum dots, nanocrystals, and nanowires; (iii) spin dependent transport, spin dependent thermal effects, and dynamical effects in semiconductors with or without spin-orbit interactions; (iv) manipulation, detection, and entanglement of electronic and nuclear spins in quantum systems such as dots, impurities and point defects; (v) ferromagnetism in semiconductors and semiconductor oxides; and (vi) spin dependent devices and device proposals involving ferromagnets and semiconductors.

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10.1.6 Frustrated magnetism (GMAG/DMP)

Simple antiferromagnets on bipartite lattices have well-understood ground states, elementary excitations, thermodynamic phases and phase transitions. At the forefront of current research are frustrated magnets where competing interactions suppress magnetic order and may lead to qualitatively new behavior.

Frustrated magnets may realize novel quantum-disordered ground states with fractionalized excitations akin to those found in one-dimensional antiferromagnets, but with a number of novel features. They are also sensitive to nominally small perturbations and interact in a non-trivial way with orbital and lattice degrees of freedom. This Focus Topic solicits abstracts for presentations that explore both theoretical and experimental aspects of the field. The themes to be represented are united by geometrical frustration: valence-bond solids and other exotic orders, spin ice, quantum spin liquids, order from disorder, magnetoelastic coupling, and novel field-induced behavior. Also of interest are the effects of strongly fluctuating spins on properties beyond magnetism including transport, thermal transport and ferroelectricity.

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10.1.7 Spin-Dependent Physics in Carbon-Based Materials (GMAG/DMP)

Research at the intersection of several forefront areas in condensed-matter and carbon-based material physics have led to new spin-dependent physics with technologically significant applications. These issues are of great current interest because of advances in spin relaxation times in graphene and breakthrough results in the field of 'organic spintronics', a new research area focused not only on the traditional topics of spintronics such as spin-polarization and spin-orbit effects but more importantly on spin-selection rules and spin-permutation symmetry effects. This Focus Topic is on spin transport, spin dynamics and exchange phenomena in carbon-based materials, such as carbon nanotubes, graphene, diamond as well as organic and molecular solids, organic radical systems, and π-conjugated organic/polymeric systems. Subjects such as spin injection at the metallic ferromagnet to graphene and inorganic to organic interface, the degree of spin polarization attainable within organic based solids, the spin coherence and relaxation related to extrinsic spin-orbit coupling effects, the hyperfine interaction between the electronic spin and nuclear magnetic moments, as well as the magnetic exchange, magnetic ordering and correlation effects in these materials are appropriate for this topic. Phenomena, materials of interest and the application for advanced devices include hybrid ferromagnetic/organic structures, spin transport in graphene and carbon nanotubes, spin qubits in diamond, quantum tunneling of the magnetic moment, magnetic field effects (e.g., organic magnetoresistance), singlet/triplet issues, spin resonance in organic semiconductors, organic spin valves and spin-polarized organic light emitting diodes.

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10.1.8 Low-Dimensional and Molecular Magnetism (GMAG/DMP)

The control and manipulation of spin and charge degrees of freedom in nanoscale systems has become a major challenge during the last decades, triggered by exciting applications in emerging technologies such as quantum computation and spin-

transport electronics. To meet this challenge, a complete understanding of the quantum behavior of interacting electronic and even nuclear spins in solid state systems is necessary. For conventional three-dimensional magnetic materials a robust framework for describing the low temperature structures, phase transitions, and excitations exists. However, when fluctuations are enhanced by low dimensionality, qualitatively new behavior can emerge. Low dimensional magnetic systems have become prototype systems in this direction. For example, the synthetic flexibility of molecule-based magnets allows the magnetic quantum response of the system to be engineered. This Focus Topic solicits abstracts that explore inorganic and organic molecule-based as well as solid-state systems, and both theoretical and experimental aspects of the field. Topics of interest include: magnetism in zero, one, and two dimensions (e.g. quantum dots, single molecule magnets, spin chains, lattices), order by disorder, the role of magnetoelastic, spin-orbit and exchange couplings, quantum critical low dimensional spin systems, topological excitations, quantum tunneling of magnetization, coherence phenomena and novel field-induced behavior.

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Upcoming Conferences

58th Conference on Magnetism and Magnetic Materials
November 4-8, 2013, Denver, Colorado

APS March Meeting 2014
March 3-7, 2014

APS April Meeting 2014
April 5-8, 2014

2014 Intermag Conference
May 4-8, 2014

59th Conference on Magnetism and Magnetic Materials
November 3-7, 2014

APS March Meeting 2015
March 2-6, 2015

APS April Meeting 2015
April 11-14, 2015

A list of magnetism related conferences can be found on the GMAG website: http://www.aps.org/units/gmag/meetings/index.cfm. Send inquiries about APS endorsement of magnetism-related meetings to gmagchair@aps.org.