Note from the Chair

Dear GMAG Members,

In this October 2025 Newsletter, our recent APS/GMAG activities and programs are highlighted. We are looking forward to the next APS Global Physics Summit! Our focus topic teams are working hard to bring you the latest advances in magnetism! Please submit your abstracts to the program!

In other news, GMAG will again provide outreach grants, and we welcome proposals on a rolling basis for projects that educate non-scientists and the general public about magnetism. Please note the various deadlines listed toward the end of this newsletter. As always, GMAG strives to grow its membership, as we are closing in on the critical mass necessary to be a new division of APS. Current APS members can take advantage of a complimentary one-year GMAG membership offer, as detailed below. Note that GMAG membership is always free for students who are APS members.

GMAG is always open to general suggestions and ideas for new activities. We encourage you to reach out via the GMAG Engage website (https://engage.aps.org/gmag/contactus).

William Ratcliff II,

National Institute of Standards and Technology; U. Maryland

GMAG Chair, william.ratcliff@nist.gov; wratclif@umd.edu

GMAG Student Travel Award 2026

https://engage.aps.org/gmag/honors/prizes-awards/student-travel-award

To increase student participation and involvement in activities essential to GMAG and the APS as a whole, GMAG will sponsor up to ten Student Travel Awards to help defray travel costs associated with attending the annual APS Global Physics Summit 2026. The awards will consist of a $500 prize for travel assistance to participate in the meeting. An additional $200 is available for those students traveling from institutions outside the United States. The selected students will have lunch with a GMAG Executive Committee member and are expected to attend the GMAG business meeting. Selected students are also expected to provide a degree of assistance at the GMAG membership table at the Global Physics Summit.

To be eligible, students must (1) present at the APS Global Physics Summit, (2) be a GMAG member, (3) provide a statement of support from a PhD scientist who is also a GMAG member and familiar with the student's work. The scientist can, but need not be, the student's PhD advisor, (4) answer three brief prompts about their research and the impact of participating in the APS Global Physics Summit.

Applications should be submitted via the APS application portal by logging in with your APS login credentials and completing all required application form fields by **November 17, 2025** (11:59 PM ET). Applicants will be notified of their application status by late December 2025. For eligibility inquiries, please contact Martin Mourigal (mourigal@gatech.edu).

Global Physics Summit 2026

Now is the time to prepare to submit your abstracts to the Global Physics Summit, with **a deadline for contributed abstracts falling on October 23, 2025**! GMAG is preparing seven exciting symposia and a strong slate of focus topics for you this year! These include new offerings on magnetism in 2D materials and on altermagnetism. We are also planning a tutorial on Numerical Tools for Modeling Spin Dynamics. Read more about the program below, and join us in Denver, CO from March 16-20, 2026!

Invited Symposia

Novel platforms to investigate low-dimensional magnetism

Recently, low-dimensional van der Waals (vdW) magnetic materials featuring exotic band structures, emergent spin organizing principles, and tunable lattice interactions have received tremendous research interest on the forefront of cutting-edge spintronics and magnetism research. By controlling the number of atomic layers, local atomic registry, and spatially tunable electromagnetic responses, a plethora of unconventional magnetic properties can be created and engineered on 2D flatland. This symposium will reflect the most recent exciting progress including quantum sensing, ultrafast optical pump/probe, electrical spin-orbit torque, and advanced theoretical and modeling approaches to investigate intriguing spin transport and dynamic properties of 2D magnet/semiconductor heterostructures, quantum magnonics systems, and low-dimensional vdW magnets.

Altermagnetism in the Lieb Lattice: from models to materials

Altermagnets offer a new route to topological and correlated states by combining distinct symmetries in real and spin space. One route to such systems is the Lieb lattice, originally proposed in the context of the Cuprates and capable of generating topological and flat bands. Such a lattice has recently realized an altermagnet state in a correlated insulator. This session will focus on this new emergent system, and the possibilities and mysteries it offers.

Emergent magnetism and proximity effects in 2D van der Waals systems

The discovery of intrinsic magnetism in two-dimensional van der Waals materials has opened an exciting frontier at the intersection of condensed matter physics, materials science, and spintronics. This symposium will highlight recent advances in understanding and engineering emergent magnetic phenomena in 2D systems, including novel spin textures, topological states, and tunable magnetic orders. Another theme will be the role of proximity effects: how interfaces between magnetic and non-magnetic or different quantum phase layers in van der Waals heterostructures give rise to new collective behaviors and interfacial functionalities.

Magnon Polaron: coherent magnon-phonon interaction

This symposium explores an emerging interdisciplinary field in hybrid magnonics: coherent coupling between spin waves (magnons) and acoustic waves (phonons). This coupling enables new physics and holds promise for developing magnon-based quantum information processing and magnon-based microelectronics for next-generation computing and sensors. The five speakers will describe recent experimental and theoretical work in coupling magnons with phonons in hybrid magnetic materials or device systems.

Quantum Spin Dynamics in Molecules and on Surfaces

Electronic spins in molecules or surface arrays of atoms possess discrete energy levels, and the associated quantum states can be tuned and coherently manipulated by means of external electromagnetic fields. Electronic spins therefore provide one of the simplest platforms to encode a quantum bit (qubit), the elementary unit of a quantum device. However, performing useful quantum tasks demands much more than realizing robust qubits—one typically also needs a means of reproducibly assembling multiple qubits and a reliable manner with which to integrate them into functional quantum devices. This 'scalability' is arguably one of the challenges for which an interdisciplinary bottom-up approach is best-suited, involving physicists, chemists, and materials scientists. This Symposium brings together a diverse group of leading researchers focused on such approaches to quantum information science, including molecule-based systems and assembly of surface arrays of atoms (artificial molecules) using an STM.

3D magnetism: nanostructures and spin textures

Three-dimensional (3D) nanomagnetic structures provide a fertile ground for stabilizing unconventional spin configurations. In particular, curvature can intricately modify the energy landscape and govern magnetic characteristics, including topology and chirality. The emergence of 3D nanomagnetism as a field allows new fundamental questions and potential technological applications from ultrahigh-density storage to neuromorphic computing. This symposium will highlight advances in this exciting field ranging from characterization with advanced microscopies to fabrication, to explorations of novel impacts of curvature and topology.

Quantum Control of Magnetism at the Nanometer Scale

This invited symposium will highlight world-class research advancing fundamentals at the intersection of quantum physics, nanoscale magnetism, and quantum sensing of spin degrees of freedom. Recent progress in solid-state quantum systems—such as NV-centers, Si, and other defect centers in diamond, hexagonal boron nitride (hBN), and

atom-scale nuclear magnetic resonance (NMR)—is transforming how magnetism is detected, quantified, imaged, and controlled at the molecular and controlled down to atomic scale. These technologies are enabling unprecedented metrological capabilities, including the detection of single nuclear spins in biological molecules, coherent control of skyrmions and spin waves, and dynamic imaging of magnetic textures with nanometer resolution.

Focus Topics

These topics encompass the bulk of current research areas in magnetism. Please select the appropriate Focus Topic when submitting your abstract for the GPS (deadline is October 23, 2025!).

10.01.01 Magnetic Nanostructures: Materials and Phenomena

Reduced dimensionality and confinement lead to magnetic states and spin behaviors that are markedly different from those observed in bulk materials. This Focus Topic explores advances in magnetic nanostructures, the novel properties that arise in magnetic materials at the nanoscale, and the advanced characterization tools required for understanding these properties. Magnetic nanostructures of interest include thin films, multilayers, graded layer structures, superlattices, nanoparticles, nanowires, nano-rings, nanotubes, 3D nanostructures, nanocomposite materials, hybrid nanostructures, 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, experimental, and technological advances.

Synthesis and characterization techniques that demonstrate nano- or atomic-scale control of properties will be featured, such as: novel deposition and lithography methods; electron microscopy (Lorentz and holographic imaging, in-situ techniques, time /frequency resolution); advances in synchrotron methods and neutron scattering techniques; and novel near-field imaging techniques, including NV center-based imaging.

Phenomena and properties of interest include magnetization reversal and dynamics (including ultrafast and THz dynamics), topology in nanoscale spin textures, spintronics, magnonics, magnetic interactions including anti-symmetric and antiferromagnetic exchange, magnetic quantum confinement, spin tunneling and spin crossover, proximity and structural disorder effects, strain effects, and thermal and quantum fluctuations.

Organizers:

1) Yishu Wang (University of Tennessee, Knoxville), wangyishu@utk.edu

2) Sergio Montoya (University of California, San Diego), s1montoya@ucsd.edu

3) Robert Streubel (University of Nebraska, Lincoln), streubel@unl.edu

4) Dhritiman Bhattacharya (Georgetown University), Dhritiman.Bhattacharya@georgetown.edu

10.01.02 Focus Topic: Emergent Properties of Complex Oxides Bulk, Thin Films, and Heterostructures

The emergence of novel states of matter, arising from the intricate coupling of electronic and lattice degrees of freedom, is a unique feature in strongly correlated electron systems. Of special interest are the ways in which the spin, lattice, charge, and orbital degrees of freedom cooperate, compete, and/or reconstruct in complex oxides to produce novel phenomena as well as novel magnetic states, often with exotic topological properties that can arise from the interplay of spin-orbit coupling and Coulomb interactions. This is further enhanced in thin films and heterostructures, where these competitions, and new phenomenon such as strain and confinement, might lead to a wide variety of interfacial phenomena such as charge transfer, orbital reconstruction, quantum confinement, proximity effects, and modifications to local atomic structure. Novel electronic and magnetic interactions and ground states thus can emerge, generating exciting new prospects both for the discovery of fundamental physics and the development of technological applications.

This Focus Topic explores the nature of such ordered states observed in bulk compounds, thin films, heterostructures, superlattices, and nanostructures of these complex metal oxides. It will provide a forum for discussing recent developments in theory, simulation, synthesis, characterization, and devices, with the aim of covering fundamental aspects and identifying key future directions in complex oxides. Associated with this complexity is a tendency for new forms of order, such as the formation of spin stripes, ferroic states, exotic spin-liquid phases with topological order and fractionalized excitations, spin-orbit entangled states or phase separation. An additional focus of this session is on how competing interactions result in spatial correlations over multiple length scales, giving rise to enhanced electronic and magnetic susceptibilities and responses to external stimuli. Overlapping with the inherent complexity of these systems, this session also invites works exploiting the emergent mechanism of entropy and disorder in the establishment of compositionally complex and high entropy ceramics. Advances in experimental techniques to probe and image magnetic order and transitions in complex oxide bulk materials and thin films (including scanning probes, optical, electron, neutron, and synchrotron-based techniques) are also emphasized. Note that overlap exists with other DMP and GMAG focus topic sessions. As a rule of thumb, if magnetism plays a key role in the investigation, then the talk is appropriate for this Focus Topic.

Organizers:

1) Dustin Gilbert (University of Tennessee, Knoxville), dagilbert@utk.edu
2) Lucas Caretta (Brown University), caretta@brown.edu
3) Zac Ward (Oak Ridge National Lab), WARDTZ@ORNL.GOV
4) Vijay Kalappatti (Northeastern University), v.kalappattil@northeastern.edu
5) Clemens Ulrich (University of New South Wales), c.ulrich@unsw.edu.au

6) Di Tian (Brown University), di_tian@brown.edu

10.01.03: Focus Topic: Spin Transport and Magnetization Dynamics

The generation, manipulation, and detection of spin currents in metals and magnetic heterostructures are of great interest for fundamental science and applications. Understanding fundamental spin-dependent transport physics, accompanied by progress in materials and nanoscale engineering, has already dramatically impacted technology. Discoveries like the giant and tunneling magnetoresistance have moved to applications, and concrete implementations of more recent discoveries, including magneto-thermal effects, spin-transfer torque, spin Hall effects, and chiral domain walls, are imminent. This Focus Topic aims to capture experimental and theoretical developments in spin transport and magnetization dynamics in metallic and semiconducting systems, such as ultra-thin films, heterostructures, lateral nanostructures, perpendicular nanopillars, and tunnel junctions. In particular, contributions describing new results in the following areas are solicited: (i) 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) Manifestations of spin-orbit interactions including, but not limited to field-like and damping-like torques on magnetic films and nanostructures, the spin Hall, inverse spin Hall, orbital Hall, inverse orbital Hall, and anomalous Hall effects; and microscopic mechanisms of magnetization damping; (iv) Electric field control of magnetic properties (e.g., anisotropy, phase transitions, etc.), including but not limited to hybrid metal/oxide structures, piezoelectric layers coupled to ferromagnetic films, and 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) Spin dependent thermoelectric phenomena such as giant magneto-thermopower and Peltier effects, spin Seebeck and Peltier effects, spin and anomalous Nernst and Ettingshausen effects, spin entropy in hopping systems, dilute Kondo systems due to the resonant interaction of the magnetic impurities with free electrons, magnon electron drag in magnetically ordered systems, paramagnon carrier drag, and paramagnetic spin fluctuation systems; (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; and (viii) General considerations concerning spin angular momentum, energy, and entropy flow, conservation laws, and Onsager reciprocity relations.

Organizers:

1) Xin Fan (University of Denver), xin.fan@du.edu

2) Mathias Weiler (Uni. Kaiserslautern), weiler@physik.uni-kl.de

3) Benedetta Flebus (Boston College), benedetta.flebus@bc.edu

4) Eric Montoya (University of Utah), eric.montoya@utah.edu

10.01.04 Focus Topic: Chiral Spin Textures and Dynamics, Including Skyrmions

Materials that display non-collinear or other complex magnetic textures are known to develop novel charge, heat, or spin transport characteristics. These properties are intrinsically related to the topology of the global magnetic spin arrangement. Understanding and mastering these phenomena reveals hidden order and dynamics in novel materials and offers exciting opportunities towards next-generation device applications and novel computing paradigms.

A rich set of fields such as spintronics, nanomagnetism, neuromorphic and quantum computing, and thermal management stand to benefit from chiral spin textures. This Focus Topic will address the most relevant and recent developments, from materials to physical modeling and device technology, in the field of chiral magnetism. Focus Topic Sessions will cover magnetic skyrmions and more complex solitons, chiral magnetization dynamics, spin-orbit torques, the physics and control of Dzyaloshinskii-Moriya interaction (DMI), DMI-induced non-reciprocity in spin waves, interfacial magnetism, topological transport phenomena, emergent electrodynamics, and novel devices based on non-trivial topological spin textures and dynamics and related topics in various material architectures (bulk/thin-films/2D, curved) and environments (strain, applied fields, thermal gradients, etc). Advanced techniques to study chiral magnetism, such as spin-polarized scanning tunneling microscopy, magneto-optical Kerr effect microscopy, Brillouin light scattering spectroscopy, spin-polarized low energy electron microscopy, NV center microscopy, Transmission electron microscopy (e.g. Lorentz, off-axis holography), neutron scattering, and synchrotron-based techniques will also be included. The aim of this Focused Topic is to promote a fundamental understanding of chiral magnetism and at the same time to facilitate innovative technology.

Organizers:

1) Alpha N. Diaye (Laurence Berkeley Laboratory), atndiaye@lbl.gov

2) Aarantzazu Mascaraque (Uni. Complutense Madrid), a.mascaraque@ucm.es

3) Maciej Dabrowski (University of Exeter), M.K.Dabrowski@exeter.ac.uk

10.01.05 Focus Topic: Quantum Spin Liquids, Candidate Materials, Models and Predictions (GMAG, DCMP)

Quantum spin liquids (QSLs) are systems built from magnetic spins or pseudospins displaying long-range entanglement, quantized topological numbers, and other phenomena with no classical counterpart. This sorting category includes real candidate materials that exhibit proximate spin liquid behavior, as well as prototypical models manifesting different forms of ground states, including topologically ordered states with anyonic excitations. Also included are theoretical and experimental efforts towards the unambiguous characterization of QSL phases, such as theoretical classifications of possible QSLs, focused material

searches, standard and novel experimental probes, and interpretation of experimental results aided by numerical simulations and first principles derivations of minimal models. Traditional candidate structures for QSL materials are frustrated networks of quantum pseudospins with particular interest in two-dimensional honeycomb, Kagome, and triangular lattices of heavy d- and f-block elements, for which strong spin-orbit coupling can induce highly anisotropic effective exchange interactions. The rare-earth pyrochlores and various Kitaev QSL candidates featuring enhanced fluctuations driven by competition between interactions on different bonds are prominent examples. The role of disorder and the development of many-body techniques that do not rely on semi-classical approximations, such as novel variational approaches, new numerical methods, and large-N expansions oriented to model the static and dynamical properties of QSLs are also part of this category. Machine learning assisted efforts oriented to discover new candidate materials and to characterize QSL states are also included under this focus topic. Additionally, this focus topic encompasses recent theoretical and experimental advancements in novel approaches to detect QSL signatures, including tunneling spectroscopy and the observation of unconventional magnetic oscillations in QSL candidate insulators.

Organizers:

1) Natalia Drichko (Johns Hopkins University), drichko@pha.jhu.edu

2) Oleg Starykh (University of Utah), starykh@physics.utah.edu

3) Radu Coldea (Oxford University), radu.coldea@physics.ox.ac.uk

10.01.06 Focus Topic: Spin-Dependent Phenomena in Semiconductors and Topological Systems

The field of spin-dependent phenomena encompasses a wide range of emerging effects, material platforms, and device concepts. Materials of interest include III–V and II–VI heterostructures, group-IV systems (Si, Ge, SiC, diamond, graphene), transition-metal dichalcogenides (TMDs) and other 2D semiconductors, oxide semiconductors, van der Waals heterostructures and others. New structures such as quantum dots, nanocrystals, nanowires, carbon nanotubes, and hybrid ferromagnet/semiconductor architectures continue to drive discovery.

This Focus Topic solicits contributions that deepen our understanding of spin-dependent processes in both magnetic and non-magnetic semiconductor-based systems. Specific areas include:

(i) electrical and optical spin injection and detection, spin pumping, spin Hall and spin–orbit effects, spin filtering, spin dynamics, and scattering;

(ii) growth and characterization of magnetic semiconductors, nanocomposites, and hybrid ferromagnet–semiconductor structures;

(iii) spin and valley dynamics in bulk (e.g., Si, Ge) and low-dimensional semiconductors (e.g., TMDs);

(iv) spin-dependent electronic, thermal, and optical transport, including proximity and heterostructure effects;

(v) spin initialization, manipulation, readout, and entanglement in quantum systems such as quantum dots, impurities, and point defects (e.g., NV centers in diamond);

(vi) spin phenomena in organic semiconductors, including magnetoresistance, magneto-electroluminescence, and resonance-driven spin pumping;

(vii) spintronic devices and proposals involving semiconductors;

(viii) spin-dependent phenomena in topological materials, such as quantum anomalous Hall effects and topological insulator/ferromagnet heterostructures;

(ix) applications of machine learning for discovery, characterization, and control of spin phenomena in semiconductors and topological systems;

(x) spin-based approaches relevant to topological quantum computing, including manipulation of Majorana modes, hybrid superconducting/semiconducting systems, and spin-coherent control in topological platforms.

Organizers:

1) Yingying Wu (University of Florida), yingyingwu@ufl.edu

2) Simranjeet Singh (Carnegie Mellon University), simranjs@andrew.cmu.edu

3) Hua Chen (Colorado State University), huachen@colostate.edu

10.01.07 Focus Topic: Frustrated Magnetism

Magnetically ordered phases have well-understood ground states, elementary excitations, thermodynamic phases, and phase transitions. In frustrated magnets, however, the competing interactions suppress magnetic ordering, leading to a qualitatively new behavior. These systems continue to occupy the forefront of current research in magnetism. The Frustrated Magnetism Focus Topic solicits abstracts for presentations exploring theoretical and experimental aspects of the field. Magnetic frustration is the common characteristic and source of emergent phenomena of the represented themes: valence-bond solids, spin-singlet states, Shastry-Sutherland systems, spin pyrochlores, spin nematics, spin ices, classical spin liquids, order-from-disorder, interplay of spin, lattice, and orbital degrees of freedom, topological magnons and other exotic states, as well as design, synthesis, and modeling of new materials with magnetic frustration. The effect of strongly fluctuating spins on properties beyond magnetism, including multiferroic properties, charge, spin, and energy transport are of further interest. Note that quantum spin liquids (QSL) are now called in FT 10.01.05.

Organizers:

1) Han Yan (ISSP Tokyo), hanyan@issp.u-tokyo.ac.jp

2) Ciaran Hickey (University College, Dublin), ciaran.hickey@ucd.ie

3) Allen Scheie (Los Alamos National Laboratory), scheie@lanl.gov

4) Danielle Yahne (Oak Ridge National Laboratory), yahnedr@ornl.gov

10.01.08 Focus Topic: Low-Dimensional Magnetism and Applications to Quantum Information Science (GMAG, DQI) [same as 17.01.38]

Magnetic systems in reduced dimensions provide fertile ground to explore many fundamental phenomena, including critical transitions, finite-size effects, spin couplings, magnonic excitations, and the mechanisms by which quantum spin states evolve and decohere. At the same time, low-dimensional magnets (LDMs) have numerous applications, including for magnetic storage and memory, as well as in quantum information processing and quantum sensing. LDMs include molecule-based systems (e.g. molecular nanomagnets, and spin chains and ladders), two-dimensional magnetic materials and heterostructures, as well as magnetic ions within solid-state materials. The interactions among spins and with environmental degrees of freedom in low dimensional systems can be tuned by chemical and physical synthetic approaches as well as by proximity effects and applied electric and magnetic fields. A variety of experimental tools have been used to probe or manipulate the quantum states of LDMs on macro- or nano-scales, such as magnetic resonance techniques, transport, magneto-optics, quantum microscopy, and measurements of susceptibility and heat capacity. This Focus Topic welcomes abstracts on experimental and theoretical work relating to exploring the fundamental physics of LDMs, novel techniques for investigating these systems, and potential applications of LDMs to the fields of magnetoelectronics, classical data storage, and quantum information science.

Organizers:

1) Steven Hill (Florida State. U./ NHMFL), shill@magnet.fsu.edu

2) Jonathan Friedman (Amherst College), jrfriedman@amherst.edu

3) Susumu Takahashi (University of Southern California), susumuta@usc.edu

4) Viven Zapf (Los Alamos National Laboratory), vzapf@lanl.gov

5) Paul Goddard (University of Warwick), p.goddard@warwick.ac.uk

10.01.09 Focus Topic: Magnetism for Emergent Technologies, Devices, and Applications (GMAG, FIAP, GDS) [same as 22.01.05, 23.01.17]

In recent years, novel magnetic systems, including those based on spintronics, have shown promise for applications in emerging technologies. Whether being used in neural networks, demonstrations of operation on flexible/wearable devices, or for other applications, these new devices offer potentially lower power and area consumption if implemented into a scaled representation. Yet to be demonstrated at scale, several challenges exist for the realization of these systems. The Magnetism for Emergent Technologies, Devices, and Applications Focus Topic solicits abstracts for presentations that will discuss the potential routes for scaling emerging technologies based on spintronics technology. Contributions at all levels of the technological stack are welcome, including but not limited to: investigation into materials to improve operation regimes, magnetic field or temperature dependence on device properties, circuit design considerations at scale, and algorithmic codesign.

Organizers:

1) William Borders (NIST), William.Borders@nist.gov

2) Saima Siddiqui (Intel), saima.siddiqui@intel.gov

10.01.10 Focus Topic: Emergent magnetism and proximity effects in 2D van der Waals systems (GMAG, DMP)

This focus topic highlights the rapidly growing field of two-dimensional van der Waals (vdW) magnets and their role in proximity-induced phenomena. The discovery of intrinsic magnetism in atomically thin vdW materials has enabled new opportunities to study spin order, magnetic excitations, and interfacial effects in the 2D limit. We invite contributions spanning theory, synthesis, characterization, and applications, to build a comprehensive understanding of how magnetism and proximity effects interact in 2D vdW magnets.

Organizers:

1) Je-Geun Park (Seoul National University), jgpark10@snu.ac.kr

2) Liuyan Zho (University of Michigan), lyzhao@umich.edu

3) Hidekazu Kurebayashi (University College, London), h.kurebayashi@ucl.ac.uk

4) Micheal McGuire (Oak Ridge National Laboratory), MCGUIREMA@ORNL.GOV

10.01.11 Focus Topic: Altermagnetism: Fundamental Physics, Material Candidates, and Characterization

Magnetically ordered materials have traditionally been studied in two main categories: ferromagnets, valued for their ability to generate strong spin-dependent responses, and antiferromagnets, which lack net magnetic moment, operate at GHz frequency and are compatible with a broad range of electronic properties. Recently, symmetry-based arguments have led to the identification of a class of materials that combine key characteristics of both ferromagnets and antiferromagnets. Owing to their alternating spin polarization in both real and momentum space, these materials have been termed altermagnets.

Since this theoretical classification, altermagnets have rapidly emerged as a major research direction in condensed matter physics, with relevance spanning spintronics, magneto-optics, topological states, and superconductivity. In recognition of their potential, Science selected altermagnetism as a runner-up for Breakthrough of the Year 2024. A growing number of exciting experimental and theoretical results are now appearing, many of which will be highlighted in this Focus Topic.

Organizers:

1) Helena Reichlova (Institute of Physics, Czech Academy of Sciences), reichlh@fzu.cz

2) Kirill Belashchenko (University of Nebraska, Lincoln), belashchenko@unl.edu

Magnetism Outreach Proposals

GMAG invites proposals directed toward educating non-scientists and the general public about the role of magnetism. Funds up to $5000 per project (larger proposals may be considered) are available to cover supplies and expenses. The GMAG Executive Committee will review proposals on an ongoing basis; strong consideration will be given to proposals received by December 31, 2025. These grants should foster new activities and are 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 high school labs on magnetism, and the production of videos on magnetism that would appeal to the general public. Preference will be given to innovative activities that are properly 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. For these purposes, proposers will be required to provide GMAG with appropriate material when requested. Proposers are also encouraged to consider alternate avenues for dissemination; this could include the presentation of the results at an APS meeting. Although the partnership with a GMAG member is encouraged, all applications for projects related to outreach in magnetism will be considered. The GMAG Executive Committee 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 incoming GMAG Chair William Ratcliff (william.ratcliff@nist.gov)

• Cover sheet clearly stating the name, address, phone number, and email of the main contact person for your application. 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. 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).

Important Information

If selected, you will be required to complete a tax form and banking information as part of the APS Financial Disbursement procedures. 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 essential for the project. An APS statement on indirect costs is available on the Physics Outreach (http://www.aps.org/programs/outreach/upload/rfp-indirectcosts15.pdf) website.

Recently funded proposals

• Development of a Robust and Deployable Magnetic Speaker Construction Kit, Prof. Daniel Shoemaker, Emily Waite, and Dr. Pamela Pena Martin, Department of Physics, University of Illinois, Urbana, IL: The interplay of magnetism and electricity is one of the defining terms in energy conversion, both on the large scale (turbines for power generation, motors for power transmission) and very small scale (data storage, magnetic sensing). Our experience in outreach has led us to conduct many demonstrations and activities that explore this relationship, but typically we find that the demonstrations are non-interactive (complex circuits, stepper motors, etc.) or too delicate (small battery-driven rotating wires). Here we propose the development of a speaker-building activity that is robust enough to serve multiple age groups and focuses on easily obtainable parts so it can be widely deployed by educators around the world. The activity connects concepts of magnetism to a technology that students should be familiar with, playing music through a speaker, and aims to build confidence in STEM.

• Magnetism Kits for 3rd Grade Classrooms, Cherie Bornhorst, Teacher in Residence Little Shop of Physics, College of Natural Sciences, Colorado State University, Fort Collins, CO: This grant would allow us to work locally with Poudre School District (PSD) teachers, to distribute a Magnetism Kit that will help them meet specific 3rd grade Next Generation Science Standards (NGSS) involving magnetism. As part of these kits we will create lesson plans and additional resources that can also be shared with a broader audience of elementary teachers looking to replicate these low-cost kits elsewhere. Little Shop of Physics currently has a 3-year rotation schedule in place to visit every PSD elementary school with our traveling science program. During our normally scheduled school visit a team of our undergraduate interns would work

alongside 3rd-grade classroom teachers to build, explore, and engage students with the activities in the Magnetism Kit. Finally, the teachers will keep the kit at their schools to use with their students year after year. Based on feedback from teachers, having the equipment they can keep on site is much more convenient, and allows it to be used expeditiously when last-minute changes in schedules occur.

Ask Your Colleagues to Join GMAG!

For only $10 additional dues, APS members can become GMAG Members with the following benefits (first year free, students join always for free!):

- The opportunity to help shape the voice and future of the magnetism community (your community) in the US.
- Receipt of the GMAG newsletter.
- Eligibility for GMAG graduate student awards and Fellowship sponsorship.
- The potential to increase the number of invited talks on magnetism at the Global Physics Summit.
- The potential to increase the number of APS Fellows sponsored by GMAG.

Reminder of Important Deadlines

Date	Event	Contact
September 30, 2025	GMAG Officer and Executive Committee nominations	Luqiao Liu luqiao@mit.edu
October 23, 2025	Global Physics Summit 2025 Abstract Submission Deadline	
November 28, 2025	Student Travel Award applications	Martin Mourigal mourigal@gatech.edu
December 31, 2025	Outreach proposals	William Ratcliff william.ratcliff@nist.gov

The GMAG Executive Committee

Position	Name	email
Chair	William Ratcliff	william.ratcliff@nist.gov
Chair-Elect	Barry Zink	barry.zink@du.edu
Vice Chair	Martin Mourigal	mourigal@gatech.edu
Past Chair	Christian Batista	cbatist2@utk.edu
Secretary/Treasurer	Sujoy Roy	sroy@lbl.gov
Members at Large:	Eleanor Clements	clementsem@ornl.gov
	Chunhui (Rita) Du	cdu71@gatech.edu
	Luqiao Liu	luqiao@mit.edu
	Saima A Siddiqui	saima.siddiqui@intel.com
	Rebecca Smaha	Rebecca.Smaha@nrel.gov
	Matthew Stone	stonemb@ornl.gov
APS Council Representative	Rachel Goldman	rsgold@umich.edu

Other Recent Magnetism-related News

William Ratcliff and Christian Batista are Associate Members of the International Union of Pure and Applied Physics (IUPAP) C9 Commission on Magnetism this year, having served as the current Chair and past Chair of the Topical Group on Magnetism (GMAG) of the American Physical Society (APS).

Upcoming Conferences and Schools

- A list of worldwide magnetism-related meetings can be found here:
  http://magnetism.eu/TPL_CODE/TPL_AGENDALISTE/6-agenda.htm
  https://ieeemagnetics.org/conferences/conferences-overview/calendar

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September 2025

- **[TMAG25] – Trends in Magnetism 2025**
  - 1–5 Sep | Bari, Italy | IEEE Region 08
  - Chairs: Mario Carpentieri, Riccardo Tomasello

- **[SMM27] – Soft Magnetic Materials Conference**
  - 8–11 Sep | Torino, Italy | IEEE Region 08
  - Chairs: Dr. Carlo Appino, Prof. Carlo Stefano Ragusa
- **[MSM25] - XIII International Conference on Magnetic and Superconducting Materials**
  - 8-11 Sep | Yerevan, Armenia
- **[Chimera 2025]**
  - 29 Sep - 2 Oct | San Sebastian (Gipuzkoa), Spain

October 2025

- **[REXS 2025] - Resonant Elastic X-ray Scattering**
  - 6-10 Oct | Almadraba, Spain
- **[ICFPM 2025] – 12th International Conference on Fine Particle Magnetism**
  - 19–23 Oct | Bariloche, Argentina | IEEE Region 09
- **[AIMagn School 2025]: Magnetic nanomaterials - The 7th Italian School on Magnetism**
  - 20-24 Oct | Perugia, Italy
- **[ICMM 2025] - 19th International Conference on Molecular Magnetism**
  - 27-31 Oct | Bordeaux, France
- **[MMM 2025] – 70th Annual Conference on Magnetism and Magnetic Materials**
  - 27–31 Oct | Palm Beach, FL, USA

November 2025

- **[XII Brazilian School of Magnetism]**
  - 3-7 Nov | Natal, Brazil

January 2026

- **[Muon Spectroscopy School 2026]**
  - 14-21 Jan | Rigi Kaltbad, Switzerland

March 2026

- **[Iwate Spintronics School 2026 Winter]**
  - 📅 3-7 Mar | 📍 Hachimantai, Iwate, Japan

April 2026

- **[Intermag 2026] - IEEE International Magnetics Conference 2026**
  - 📅 13-17 Apr | 📍 Manchester, UK

May 2026

- **[WUN-SPIN2026] - 6th WUN International Conference on Spintronics and Spintronic Materials**
  - 📅 8-11 May | 📍 Suzhou, China & ONLINE

June 2026

- **[THERMAG XI] - 11th IIR International Conference on Solid State Cooling, Heating, and Energy Harvesting**
  - 📅 7-11 Jun | 📍 Ljubljana, Slovenia
- **[NanoMRI8] - Nanoscale MRI**
  - 📅 22-26 Jun | 📍 Scheltema, Netherlands
- **[PM'26] - Physics of Magnetism 2026**
  - 📅 22-26 Jun | 📍 Poznań, Poland
- **[TRTM 2026] - 3rd Transnational Round Table on Magnonics, High-Frequency Spintronics, and Ultrafast Magnetism**
  - 📅 29 Jun - 3 Jul | 📍 Poznań, Poland

July 2026

- **[EMSA 2026] - XV European Magnetic Sensors and Actuators Conference**

- 6-9 Jul | Eindhoven, the Netherlands

August 2026

- **[ESM2026] - The European School on Magnetism 2026**
  - 17-28 Aug | Uppsala, Sweden

September 2026

- **[UMC 2026] - Ultrafast Magnetism Conference**
  - 28 Sep - 2 Oct | Eindhoven, the Netherlands

November 2026

- **[MMM 2026] - 71st Annual Conference on Magnetism and Magnetic Materials**
  - 2-6 Nov | Honolulu, HI, USA