Dear Members of the DPG Division of Magnetism,

Eight Focus Sessions (FS1-8) and five Invited Talks (HV1-5) were proposed for the Berlin 2018 meeting. A summary and the full proposals are attached. Please indicate your preferences until 20 October at

**https://beta.doodle.com/poll/ghcauqvm8nrxpxg6**

The proposals with the highest rating will be approved.

Thank you very much,

Manfred Fiebig
(MA Speaker)

## Proposals for MA Focus Sessions at DPG Berlin 2018

| | Suggested by | Session title | Proposed speakers |
|---|---|---|---|
| FS 1 | Chu Chun Fu, Thomas Hammerschmidt, Tilmann Hickel, Veronique Perron-Bohnes (EPS) | Magnetism in Materials Science: Thermodynamics, Kinetics and Defects | Anders Bergman (Uppsala, Sweden), Silke Biermann (Palaiseau, France), Sergei Dudarev (Oxford, United Kingdom), Cécile Hébert (Lausanne, Switzerland), Christian Mény (Strasbourg, France), Dmitri Molodov (Aachen, Germany) |
| FS 2 | Gianluca Gubbiotti, Maciej Krawczyk, Andrii Chumak (EPS) | New Frontiers in Magnonics | N.N. |
| FS 3 | Vincent Cros, Giovanni Finocchio (EPS) | Spinorbitronics : from efficient charge/spin conversion based on spin-orbit coupling to chiral magnetic skyrmions | N.N. |
| FS 4 | Cornelius Nielsch, Michael Farle, Manuel Vazquez (EPS) | Magnetic Structurally and Compositionally Modulated Nanowires and Nanotubes | Dora Altbir (Universidad Santiago de Chile, USACH), Cristina Bran (Institute of Materials Science of Madrid, CSIC), Juan Escrig / Pedro Landeros (Universidad de Chile), Olivier Fruchart (CNRS/CEA, Grenoble), Yong Lei (Institute of Physics & IMN Macro Nanos (ZIK), Ilmenau), Dennis Makarov (Helmholtz-Zentrum Dresden-Rossendorf), Jorge Otalora (Leibniz Institute for Solid State and Materials Research Dresden Dresden), Salvador Pané (Institute of Robotics and Intelligent Systems ETH Zürich), Ulf Wielwald (Universität Duisburg-Essen) |
| FS 5 | Daniele Pinna, Karin Everschor-Sitte | Exploiting Spintronics for Unconventional Computing | Supriyo Datta, Purdue University, USA; Julie Grollier, Unite Mixte de Physique CNRS/Thales, France; Mark Stiles, National Institute of Standards and Technology (NIST), USA; Theo Rasing, Radboud University, Nijmegen; Mathias Kläui, Johannes Gutenberg University, Germany |
| FS 6 | Oliver Rader, Steffen Wirth | The controversial physics of samarium hexaboride | Prof. Piers Coleman (Rutgers, theory), Dr. Jonathan Denlinger (Berkeley, LBL-ALS, expt.), Dr. Sahana Rößler (Dresden, MPI-CPFS, expt.), Dr. Emile Rienks (Dresden, TU/IFW, expt.), Dr. Johannes Knolle (Cambridge, theory) |
| FS 7 | Joachim Gräfe, Markus Weigand, Eberhard Goering | Nanomagnetismus im Röntgenlicht | Kahraman Keskinbora, Max-Planck-Institut für Intelligente Systeme; Gerd Schneider, Helmholtz Zentrum Berlin; Claus M. Schneider, Forschungszentrum Jülich; Stefan Cramm, Forschungszentrum Jülich; Stefan Eisebitt, Max-Born-Institut; Mathias Kläui, Universität Mainz; Guido Maier, Max-Planck-Institut für Struktur und Dynamik der Materie; Sebastian Wintz, Paul Scherrer Institut |
| FS 8 | Johann Kroha | Ultrafast Time-Resolved Probing of Correlation Dynamics in Magnetic Materials | Prof. Dr. Martin Eckstein, University of Erlangen-Nürnberg; Dr. Shovon Pal, ETH Zürich; Prof. Dr. Jim Freericks, Georgetown University, USA; Prof. Dr. Rupert Huber, University of Regensburg; Dr. Tobias Kampfrath, Fritz-Haber-Institute Berlin; Dr. A. Julia Stähler, Fritz-Haber-Institute Berlin |

## Proposals for MA Invited Speakers at DPG Berlin 2018

| | Suggested by | Talk title | Proposed speaker |
|---|---|---|---|
| FS 1 | Karin Everschor-Sitte | Novel interface effects in ferromagnet-superconductor heterostructures | Prof. Dr. Kjetil M. D. Hals,<br>Western Norway University of Applied Sciences |
| FS 2 | Wolfgang Belzig | Quantum magnonics at Ferrimagnet-Normal metal interfaces | Dr. Akashdeep Kamra (Department of Physics, University of Konstanz) |
| FS 3 | Michael Farle | Emission of ultrashort propagating spin waves from nanoscale magnetic vortex cores | Dr. Sebastian Wintz, Paul Scherrer Institut, 5232 Villigen PSI, Switzerland<br>Helmholtz-Zentrum Dresden-Rossendorf, 01328 Dresden, Germany |
| FS 4 | Christian Back | Skyrmionen in Heterostrukturen und Nanostrukturen mit Synchrotronmethoden | Felix Büttner, MIT |
| FS 5 | Manfred Fiebig | Competition between magnetic order and heavy-fermion disorder leading to quantum-criticality | Prof. Johann Kroha, University of Bonn |

# Magnetism in Materials Science:

# Thermodynamics, Kinetics and Defects


## Abstract

In the framework of materials science, significant efforts are devoted to the development of specially tailored magnetic compounds for a broad range of modern technologies like automotive, energy generation and energy conversion. While the impact of magnetism on various functional properties is widely studied, much less is known about the interplay of magnetism, microstructure and mechanical properties, which is decisive to optimize the structural aspects of these applications. An important challenge for materials science is hence to understand the influence of magnetism (i) on thermodynamic properties like phase-stability, (ii) on kinetic processes like phase-transitions, (iii) on the formation and mobility of defects like vacancies and dislocations, and (iv) on the resulting macroscopic mechanical properties.

In the symposium we will review the current state of the art in the field of magnetism in materials science. Topics that will be addressed and that are open to abstract submission are:

- Advanced modelling and simulation methods of magnetism in alloys
- Characterisation and simulation of phase-stability, diffusion and microstructure evolution in bulk/thin-film magnetic alloys
- Characterisation and simulation of magnetic structure and ordering in bulk alloys, thin-films and multilayers.
- Effect of magnetic entropy and magnetic transition in materials properties
- Magnetic properties driven by microstructure and compositional changes
- Advanced methods to characterize defects in alloys
- Advanced study of (inter)diffusion in alloys and multilayers

The symposium will consist of invited talks, contributed talks and a poster session. The contributions of the symposium should highlight the importance of magnetism in structural materials for progress in materials science by providing theoretical or experimental insight, by addressing open questions, by contributing to method development or similar.


## Invited speakers (tentative)

Anders Bergman (Uppsala, Sweden), Silke Biermann (Palaiseau, France), Sergei Dudarev (Oxford, United Kingdom), Cécile Hébert (Lausanne, Switzerland), Christian Mény (Strasbourg, France), Dmitri Molodov (Aachen, Germany)

## Organizers


Dr. Chu Chun Fu, DEN/DMN/SRMP CEA-Saclay, Gif-sur-Yvette, France
Dr. Thomas Hammerschmidt, ICAMS, Ruhr-Universität Bochum, Bochum, Germany
Dr. Tilmann Hickel, Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany
Dr. Véronique Pierron-Bohnes, IPCMS CNRS-Unistra, Strasbourg, France


## Contact


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Magnetism,Surface and interfaces; Structural And Dynamical Properties Of Solids

FS 2

MA

**New Frontiers in Magnonics**

Magnonics is now a well-established field of research which uses spin waves for carrying and process information in magnetic nanostructures with periodic modulation. Ten years are already passed since the first experimental evidence that artificial periodicity influences the spin waves band structure giving rise to intervals of allowed SW frequencies and forbidden gaps in which there are no allowed magnonic states.

Up to now most of the studies have been focused on planar nanostructures where the magnetic constituents have the same thickness while efficient re-programmability of dynamic response still remains a largely unexplored research area.

The aim of the proposed session is to move the Magnonics frontiers towards applications which are achieved by the efficient control of magnonic properties via external stimuli (such as an electric or a strain field) and by the creation of three-dimensional nanostructures.

These goals can be pursued by the cross-fertilization between the magnonics community and those of photonics, spin-orbitronics, spintronics and straintronics.

The symposium is therefore open to people coming from different research areas and with different expertise.

Proposed by:

1: Gianluca Gubbiotti
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Magnetism, Spintronics, Surface physics

FS 3

MA

**Spinorbitronics : from efficient charge / spin conversion based on spin-orbit coupling to chiral magnetic skyrmions**

This session will focus on the novel direction of spintronics – often called spin-orbitronics – that exploits the Spin-Orbit Coupling (SOC) in nonmagnetic materials instead of the exchange interaction to open fascinating new roads for basic research and new line of technologies. A first aim of this symposium will be to review both fundamental and theoretical recent advances made in using spin-orbit effects for generating or detecting spin-polarized currents either through bulk contributions e.g. the Spin Hall Effect or at interfaces through Rashba effects or topological surface states in topological insulators.

Spin-orbit coupling can also be used in magnetic materials to stabilize chiral domain walls or topological objects such as magnetic skyrmions, that have generated a strong interest in the last couple of years. The second objective of this focused session will be to review the most recent significant results obtained to generate and characterize strong interfacial Dzyaloshinskii-Moriya Interactions (DMI). Beyond the stabilization of Néel domain walls in perpendicular magnetic layers with great promises for a new generation of racetrack memories, it has been recently shown that this chiral interaction plays a crucial role in the observation of magnetic skyrmions at room temperature. The goal will be here also to gather the key advances on the physics of magnetic skyrmions as well as on the potential applications and concept devices that shall leverage on their fascinating topological properties.

Proposed by:

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# European Physical Society
## Condensed Matter Division

FS 4

**"Magnetic Structurally and Compositionally Modulated Nanowires and Nanotubes"**

**Description of the Proposed Mini-colloquium:**
The tentative title is "**Magnetic Structurally and Compositionally Modulated Nanowires and Nanotubes**". It is proposed to be within the **Division on Magnetism** and has strong overlaps with other divisions like the Physics of Metals and Materials.
Contributions include aspects as: i) advanced methods for the synthesis of nanowires and nanotubes with designed/engineered geometry and composition for specific applications; ii) advanced characterization techniques (i.e., structure, magnetic, HRTEM, PEEEM/XRMD, Electron Holography, FMR); fundamental magnetism in individual nanowires (i.e., demagnetization mechanism, domain walls, micromagnetics, high-frequency, anisotropy effects); iii) Theoretical aspects and Micromagnetic modelling, iv) Nanowires & Nanotubes and their 3D arrays for applications (e.g., microwave, thermo-electric phenomena, magnetic and magnetomechanical sensors or biofunctionalization).

**Estimated Audience (who & how many would attend):**
Research on the proposed topic is performed by a number of teams distributed all over the world. We expect a large audience, since nanowires and –tubes have become increasingly recognized in a steadily increasing number of high-impact publications. Teams are mostly located in European countries (Germany, Spain, France, UK or Slovenia) but also in other countries like USA and China, as well as in Chile, Brazil, Saudi Arabia, Russia, *et cetera*.
A rough estimation of attendees could be in the order of 100 to 120 (please, check).
That would include 5 invited speakers, around 10-15 selected oral contributions and a poster session. These numbers can be adapted to accommodate the requirements of the conference.

**Motivation:**

There is an increasing scientific activity on magnetic nanowires and nanotubes with tunable circular section (as opposed to nanostripes). Length, diameter, shell thickness and materials can be selected from a wide range of magnetic alloys and elements. Axially and radially modulated structured can be synthesized. These families of cylindrical wires and tubes are currently proposed in a number of applications ranging from specific media for magnetic memory applications ("race-track"), microwave applications ("stealth" absorbing materials), magnetic sensing elements and logic devices at the nanoscale (nano-technology), or for applications based on their magneto-thermo-electrical properties ("energy conversion and harvesting"). Other relevant applications include their organic functionalization for a number of biomedical applications.
Most of those applications derive from their unique magnetic characteristics namely the magnetic configuration (e.g., magnetic domains), demagnetization process (e.g., nucleation and depinning of transverse or vortex domain walls; coherent/non-coherent rotational processes), and frequency dependent behaviour (e.g., microwave absorption phenomena).
In short, the motivation of this Mini-colloquium is to bring together specialists and scientists interested in novel applications of anisotropic nanostructures to discuss and exchange ideas on both fundamental and applied issues of these nanowires and nanotubes.

**Organizer 1:**

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**Organizer 2:**

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Telephone number:

**Organizer 3:**

Name: Manuel Vazquez
Institution: Institute of Materials Science of Madrid, CSIC
City: Madrid
Country: Spain
Email: mvazquez@icmm.csic.es
Telephone number:

**Tentative list of Speakers and Topics.-**

- Dora Altbir (Universidad Santiago de Chile, USACH) - *On the magnetization reversal of nanowires/nanotubes* (theoretical).

- Cristina Bran (Institute of Materials Science of Madrid, CSIC)- *Domains and domain walls in cylindrical modulated nanowires* (experimental).

- Juan Escrig / Pedro Landeros (Universidad de Chile) – *Analythical calculations in nanowires/nanotubes* (theoretical).

- Olivier Fruchart (CNRS/CEA, Grenoble) – *Magnetic nanowires and nanotubes as building blocks for 3D race track-memory* (experimental/theoretical).

- Yong Lei (Institute of Physics & IMN Macro Nanos (ZIK), Ilmenau) - *Multiple nanostructures based on anodized aluminium oxide templates* (experimental)

- Dennis Makarov (Helmholtz-Zentrum Dresden-Rossendorf) - *Rolled up magnetic sensors and magneto-electronic stechable sensors* (experimental)

- Jorge Otalora (Leibniz Institute for Solid State and Materials Research Dresden Dresden) - *Curvature-Induced Asymmetric Spin-Wave Dispersion* (theoretical)

- Salvador Pané (Institute of Robotics and Intelligent Systems ETH Zürich) - *Hybrid Magnetoelectric Nanowires for Nanorobotic Applications* (experimental).

- Ulf Wielwald (Universität Duisburg-Essen) – *Magnetic coupling for enhanced magnetic hardness of nanowires* (experimental).

FS 5

Dear Prof. Fiebig,

hereby we would like to suggest to organize a Focus Session overviewing spintronic applications to contemporary computing paradigms for the next DPG spring meeting. We expect this topic to be interesting to the magnetism, semiconductor, thin film, as well as materials community.

1) title: "Exploiting Spintronics for Unconventional Computing"

2) Coordinators:
Daniele Pinna, dapinna@uni-mainz.de
Karin Everschor-Sitte, kaeversc@uni-mainz.de

3) Short (10-15 lines) justification:
Over the past century, the miniaturization of electronics has improved commensurately to the growth in computational power following an empirical relationship known as “Moore’s law”, an observation that microprocessor performance doubles every 18 months. It has now become clear that this trend will unlikely continue in the future due to limits both in the downscaling of transistors as well as the fundamental throughput of data between CPU and memory elements in traditional Von Neumann computer architectures. A completely new path forward has however been offered by bioinspired approaches to computation which attempt to capture the intrinsic parallelism and energy efficiency exhibited by the animal brain. The past two decades have in fact seen the flourishing of digital machine learning and deep neural network techniques to process data intensive tasks ranging from image recognition to AI development. The next frontier will consist of further optimizing these approaches by designing physical devices capable of implementing these functional principles analogically. Advances in nanomagnetism and spintronics have assembled a versatile toolbox of electrically controllable phenomena whose applications not only integrate seamlessly within current CMOS architectures but also present a radical new horizon for the evolution of device construction and development. The goal of this focus session is to construct a comprehensive picture of the state-of-the-art of spintronic applications to unconventional computing paradigms such as Boltzmann Machines, Neural Network, Probabilist and Reservoir Computing.

The talks will bring together leading scientist in the rapidly evolving field of spintronic computing to highlight the roles that thermally susceptible magnetization dynamics as well as the use of exotic magnetic vortex and skyrmion textures can play in shaping the computing devices of tomorrow.

4) Possible Speakers:
-- **Supriyo Datta**, Purdue University, USA:
*“Stochastic p-bits for Invertible Logic”*
-- **Julie Grollier**, Unite Mixte de Physique CNRS/Thales, France:
*“Neuromorphic computing with nanoscale spintronic oscillators”*
-- **Mark Stiles**, National Institute of Standards and Technology (NIST), USA:
*“Spintronic nanodevices for bioinspired computing”*
-- **Theo Rasing**, Radboud University, Nijmegen
*“Bits and Brains”*
-- **Mathias Klaui**, Johannes Gutenberg University, Germany
*“Magnetic Skyrmions for Unconventional Computing”*

With warm regards,
Daniele Pinna & Karin Everschor-Sitte

FS 6

Proposal for a MA Focus Session, SKM Spring Meeting, Berlin, 2018

**"The controversial physics of samarium hexaboride"**

Coordinators: Oliver Rader (FV AM) and Steffen Wirth (FV O)

(rader@helmholtz-berlin.de, wirth@cpfs.mpg.de)

$SmB_6$ is famous for being the first mixed-valent compound and the first Kondo insulator. What, however, had remained a mystery for 40 years is an anomalous residual metallicity [1]. In 2010, Coleman et al. suggested that heavy fermions, most notably $SmB_6$, can be topological insulators [2]. This assignment, which would solve that riddle elegantly, received support by new sophisticated transport and magnetization measurements and many ARPES studies, just when an alternative, trivial, interpretation was put forward by Rienks et al. Advanced scanning tunneling spectroscopy of the in-gap structure supports a strongly reduced Kondo temperature at the surface (Rößler et al.). In a situation, when the community is trying to reconcile these surface spectroscopic results, new bulk sensitive investigations report bulk quantum oscillations and residual thermal transport in the insulating low-temperature state [3,4]. What appears like a contradiction in itself has triggered highly interesting theoretical studies by at least two groups so far [4,5]. - A focus session with a program like to the one proposed below would be perfectly timed and extremely interesting for the German MA community as well as O, TT, and HL to understand the progress and identify novel research directions opened by this fascinating material. The proposed session covers a key subject within SPP 1666 "Topological insulators" where several funded projects explicitly deal with $SmB_6$ as well as SFB 1170 "Topological and Correlated Electronics at Surfaces and Interfaces".

As speakers we suggest:

Prof. Piers **Coleman** (Rutgers, theory), „$SmB_6$ as topological Kondo insulator and failed superconductor", colemanpiers@gmail.com, www.physics.rutgers.edu/~coleman/

Dr. Jonathan **Denlinger** (Berkeley, LBL-ALS, expt.) „Angle-resolved photoemission and quantum oscillations of $SmB_6$", jddenlinger@lbl.gov, als.lbl.gov/people/jonathan-denlinger/

Dr. Sahana **Rößler** (Dresden, MPI-CPFS, expt.) „Scanning tunneling microscopy and spectroscopy of in-gap states of SmB6", Sahana.Roessler@cpfs.mpg.de, www.cpfs.mpg.de/person/29048/1667322

Dr. Emile **Rienks** (Dresden, TU/IFW, expt.) „ $SmB_6$: a trivial surface conductor", emile.rienks@helmholtz-berlin.de, www.ifw-dresden.de/institutes/iff/synchrotron-methods/members/

Dr. Johannes **Knolle** (Cambridge, theory) „The role of excitons in thermodynamic and transport anomalies of $SmB_6$", jk628@cam.ac.uk, www.tcm.phy.cam.ac.uk/profiles/jk628/

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[1] J. W. Allen, *Foreword for special issue of philosophical magazine on: topological correlated insulators and $SmB_6$*, Phil. Mag. 96, 3227 (2016) and refs. therein

[2] M. Dzero, K. Sun, V. Galitski, P. Coleman, *Topological Kondo Insulators*, Phys. Rev. Lett. 104, 106408 (2010)

[3] B. S. Tan et al., *Unconventional Fermi surface in an insulating state*, Science 349, 287 (2015)

[4] J. Knolle, N. R. Cooper, *Excitons in topological Kondo insulators: Theory of thermodynamic and transport anomalies in $SmB_6$*, Phys. Rev. Lett. 118, 096604 (2017) and refs. therein

[5] O. Erten, Po-Yao Chang, P. Coleman, A. M. Tsvelik, *Skyrme insulators: insulators at the brink of superconductivity*, arXiv:1701.06582v2

FS 7

Symposiumvorschlag 2018

# Nanomagnetismus im Röntgenlicht

## Federführender Fachverband:

Magnetismus

## Unterstützende Fachverbände:

Kristalline Festkörper und deren Mikrostruktur / Dünne Schichten

## Organisatoren:


- Joachim Gräfe, Max-Planck-Institut für Intelligente Systeme, graefe@is.mpg.de
- Markus Weigand, Max-Planck-Institut für Intelligente Systeme, mweigand@is.mpg.de
- Eberhard Goering, Max-Planck-Institut für Intelligente Systeme, goering@is.mpg.de


## Mögliche Sprecher:


- Kahraman Keskinbora, Max-Planck-Institut für Intelligente Systeme, keskinbora@is.mpg.de
- Gerd Schneider, Helmholtz Zentrum Berlin, gerd.schneider@helmholtz-berlin.de
- Claus M. Schneider, Forschungszentrum Jülich, c.m.schneider@fz-juelich.de
- Stefan Cramm, Forschungszentrum Jülich, s.cramm@fz-juelich.de
- Stefan Eisebitt, Max-Born-Institut, eisebitt@mbi-berlin.de
- Mathias Kläui, Universität Mainz, klaeui@uni-mainz.de
- Guido Maier, Max-Planck-Institut für Struktur und Dynamik der Materie, guido.meier@mpsd.mpg.de
- Sebastian Wintz, Paul Scherrer Institut, sebastian.wintz@psi.ch


## Abstract


X-ray microscopy allows the application of powerful spectroscopic techniques in length scales far smaller than possible with optical microcopy. Near Edge X-ray Absorption Fine Structure (NEXAFS) allows element and chemically sensitive imaging, while X-ray Circular Magnetic Dichroism (XMCD) allows direct, highly sensitive detection of sample magnetization.

These contrast mechanisms at spatial resolutions of below 15 nm [1], and even better using emergent techniques like ptychography [2], combined with the possibility of using the time structure of synchrotron light for pump- and- probe imaging with time resolutions of <50 ps make x-ray microscopy a powerful tool.

This combination of lateral and temporal resolution and magnetic contrast is especially useful for the investigation of magnetic phenomena on the nanoscale [3-5]. One example is the investigation of skyrmions and their motion [3, 4]. Another example is magnonics, *i.e.* the manipulation of spin waves, which has gained significant scientific interest in the past years [5]. These nanostructures have great potential for technological applications in data processing and storage, and spintronics [3-5]. By use of advanced x-ray microscopy with XMCD contrast, emergent magnetic phenomena can be directly imaged and observed in real space on a scale that goes beyond the capabilities of any other technique.



[1] W. Chao *et al.*: Nature 435 (2005) 1210.
[2] D. A. Shapiro *et al.*: Nature Photonics 8 (2014) 765.
[3] S. Woo *et al.*: Nature Materials 15 (2016) 501.
[4] K. Litzius *et al.*: Nature Physics 13 (2017) 170.
[5] S. Wintz *et al.*: Nature Nanotechnology 11 (2016) 948.

**Proposal for a MA Focus Session, SKM Spring Meeting, Berlin 2018**

**Ultrafast Time-Resolved Probing of Correlation Dynamics in Magnetic Materials**

FS 8

**Coordinator:** Johann Kroha, Universität Bonn, kroha@physik.uni-bonn.de

In cooperation with the division TT ("Tiefe Temperaturen")

**Motivation:**

The multi-particle approach that distinguishes strongly correlated oxides from semiconductors complexity gives rise to fascinating phenomena, ranging from long-range magnetic order to discoveries like superconductivity, colossal magnetoresistance and topological magnetic or electric states. For a thorough understanding, it is indispensable, however, not only to study the ground state of a correlated system but to study its dynamical behavior. On the one hand, the functionality of a device always results from bringing it away from its ground state. On the other hand, studying the non-equilibrium behavior reveals the microscopic processes at work that stabilize a strongly correlated state. Early experiments on correlation dynamics were mostly targeted at experimental investigation of ultrafast magnetization dynamics and its description by phenomenological approaches ("three-temperature model"). Over the last years, experimental and theoretical tools have been rapidly improving. With this, the focus on magnetization dynamics is replaced by a view on the dynamics of systems with strongly correlated electrons in general, with magnetism as only one of its many possible manifestations. With our focus session, we present an overview over current facets in the discussion of strong-correlation dynamics and its relation to magnetization-dynamical processes.

The invited talks may be supplemented by appropriate contributed talks.

**Possible speakers (alphabetical order):**

- Prof. Dr. Martin Eckstein, University of Erlangen-Nürnberg (Theory)
  https://www.physik.nat.fau.de/person/martin-eckstein
  Tentative title of presentation:
  Theory of time-resolved quasiparticle dynamics in strongly correlated materials
  (also related to the topic of Dr. J. Stähler, see below)
- Dr. Shovon Pal, ETH Zürich (Experiment)
  http://www.ferroic.mat.ethz.ch
  Tentative title of presentation:
  Time-resolved collapse and revival of the heavy-fermion state near a quantum phase transition
- Prof. Dr. Jim Freericks, Georgetown University, USA (Theory)
  https://physics.georgetown.edu/users/jim-freericks
  Tentative title of presentation:
  Theory of time- and angle-resolved photoemission spectroscopy (trARPES)
- Prof. Dr. Rupert Huber, University of Regensburg (Experiment)
  http://www.physik.uni-regensburg.de/forschung/huber
  Tentative title of presentation:
  Light-wave driven quasiparticle collisions on a subcycle timescale
- Dr. Tobias Kampfrath, Fritz-Haber-Institute Berlin (Experiment)
  http://www.fhi-berlin.mpg.de/pc/KAMPFRATH
  Tentative title of presentation:
  Terahertz-driven nonlinear spin response of antiferromagnetic Nickel oxide
- Dr. A. Julia Stähler, Fritz-Haber-Institute Berlin (Experiment)
  http://www.fhi-berlin.mpg.de/pc/electrondynamix
  Tentative title of presentation:
  Ultrafast electronic band gap control in an excitonic insulator

HV 1

*Prof. Dr. Kjetil M. D. Hals*
*Email: kmdh@hvl.no*
*Western Norway University of Applied Sciences*

**Tentative title of the talk:**
**Novel interface effects in ferromagnet-superconductor heterostructures**

**Short justification**

At the interface between a superconductor and a ferromagnet, a range of electronic states can be induced which are radically different from either constituent materials. In superconductor-ferromagnet heterostructures, spin-orbit coupling or magnetic textures generates a magnetoelectric coupling between the superconducting condensate and the magnetization. This coupling makes it possible to

1. manipulate the magnetization using supercurrents or to control the superconducting state via the magnetization. For example, Kjetil M. D. Hals has shown that a texture-induced magnetoelectric coupling produces a strong supercurrent along a helical Yu-Shiba-Rusinov chain. [1]
2. create an entirely new class of composite topological excitations in superconductor-ferromagnet heterostructures, which consists of bounded skyrmion-vortex pairs. [2] A very interesting aspect of such a composite excitation is that the skyrmion-vortex pair can bind a Majorana fermion and thus opens up the way for manipulating Majorana fermions with standard spintronic techniques.

[1] Kjetil M. D. Hals, Phys. Rev. B **13**, 134504 (2017)
[2] Kjetil M. D. Hals, Michael Schecter and Mark S. Rudner, Phys. Rev. Lett. **117**, 017001 (2016).

Suggested by: K. Everschor-Sitte

HV 2

**Manfred Fiebig**

*Von:* Wolfgang Belzig <wolfgang.belzig@uni-konstanz.de>
*Betreff:* Vorschlag für Einladung zur DPG-Tagung
*Datum:* Thu, 28 Sep 2017 21:48:37 +0200
*Kopie an:* "Prof. Dr. Burkard Hillebrands" <hilleb@physik.uni-kl.de>
*An:* <manfred.fiebig@mat.ethz.ch>

Lieber Herr Fiebig,

ich bin ja leider nicht in der AG Magnetismus, wollte aber trotzdem gerne vorschlagen, Dr. Akash Kamra einzuladen. Zur Motivation will ich folgendes anbringen:

Dr. Akashdeep Kamra (Department of Physics, University of Konstanz)

Tentative title: Quantum magnonics at Ferrimagnet-Normal metal interfaces

In the last year A. Kamra has contributed significantly to the theoretical development in the emerging field of quantum magnonics. In particular he has predicted that unusual and unexpected properties of magnons in the quantum regime show up in the spin pumping transport at an interface to a normal metal. Among these predictions are the non-integral spin of magnons in the presence of dipolar interaction[1,2,3], its manifestation in the spin current shot noise [1], as well the first full general spin-pumping expression [4] correcting several eminent papers in the literature. Beyond the mainly theoretical activity, Akash Kamra continues to publish with experimentalists [5].

[1] Akashdeep Kamra and Wolfgang Belzig
Squeezed-Magnon mediated Spin Transport
Phys. Rev. Lett. 116, 146601 (2016).

[2] Akashdeep Kamra and Wolfgang Belzig
Magnon-mediated spin current noise in ferromagnet|non-magnetic conductor hybrids
Phys. Rev. B 94, 014419 (2016).

[3] Akashdeep Kamra, Utkarsh Agrawal, and Wolfgang Belzig
Non-integer-spin bosonic excitations in untextured magnets
Phys. Rev. B 96, 020411(R) (2017).

[4] Akashdeep Kamra and Wolfgang Belzig
Spin pumping and shot noise in ferrimagnets: bridging ferro- and antiferromagnets
arXiv:1706.07118 (submitted to Phys. Rev. Lett.)

[5] Matthias Pernpeintner, Akashdeep Kamra, Sebastian T.B. Goennenwein, Hans Huebl
Characterizing spin transport: detection of spin accumulation via magnetic stray field
arxiv:1709.01820

Ich kann noch mehr liefern, aber wollte erstmal die Anfrage starten, ob Sie überhaupt Nominierungen von außen akzeptieren.

Viele Grüße
Wolfgang Belzig

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HV 3

**Proposal for Invited talk at DPG-2018, Berlin, section – Magnetism (MA)**

Dr. Sebastian Wintz

Paul Scherrer Institut, 5232 Villigen PSI, Switzerland
Helmholtz-Zentrum Dresden-Rossendorf, 01328 Dresden, Germany
https://www.psi.ch/lsc/sebastian-wintz
E-Mail: sebastian.wintz@psi.ch

Tentative Title: Emission of ultrashort propagating spin waves from nanoscale magnetic vortex cores

Dr. Sebastian Wintz recently has shown that tunable excitation of short-wavelength spin waves with frequencies up to 4 GHz is possible using the gyration of nanoscale magnetic vortex cores. Time-resolved scanning transmission X-ray microscopy was used for direct imaging of coherently excited propagating magnons. This research has great impact on the field of magnon-spintronics offering novel concepts of generating and processing spin waves. Therefore, the very recent studies on the generation and propagation of ultrashort spin waves with frequencies *above* 10 GHz led by S. Wintz (current paper is under review ) are of high interest, (both, theory and experiment). He is a good and enthusiastic speaker.
I strongly support him for an invited talk in a section devoted to magnonics.

Recent papers:

S. Finizio, S. Wintz, E. Kirk, A.K. Suszka, S. Gliga, P. Wohlhüter, K. Zeissler, J. Raabe
“Control of the gyration dynamics of magnetic vortices by the magnetoelastic effect”
Phys. Rev. B **96**, 054438 (2017)

S. Wintz, V. Tiberkevich, M. Weigand, J. Raabe, J. Lindner, A. Erbe, A. Slavin, J. Fassbender
"Magnetic Vortex Cores as Tunable Spin-Wave Emitters"
Nature Nanotech. **11**, 948 (2016)

S. Wintz, C. Bunce, A. Neudert, M. Körner, T. Strache, M. Buhl, A. Erbe, S. Gemming, J. Raabe, C. Quitmann, J. Fassbender
"Topology and origin of effective spin meron pairs in ferromagnetic multilayer elements"
Phys. Rev. Lett. **110**, 177201 (2013)

*Proposed by Michael Farle*

HV 4

**Von:** Christian Back [mailto:Christian.Back@physik.uni-regensburg.de]
**Gesendet:** Mittwoch, 20. September 2017 08:49
**An:** Mitglieder
**Betreff:** Antw: DPG - FV MA - Proposals for Focus Sessions and Invited Speakers for Berlin 2018

Lieber Manfred,

ich würde gerne Felix Büttner für einen Hauptvortrag vorschlagen.
Er hat bei M. Kläui/ S. Eisebitt promoviert und ist jetzt Postdoc in der Gruppe von G. Beach am MIT.
In Zusammenarbeit der Gruppen Kläui/Eisebitt/Beach hat er sich vor allem für Skyrmionen in Heterostrukturen interessiert und Skyrmionen in Nanostrukturen mit Synchrotronmethoden untersucht. Demnächst kommt zu diesem Thema ein Nature Nano raus (**arXiv:1705.01927** ).

Viele Grüße,
Christian

HV 5

**Proposal for Invited talk at DPG-2018, Berlin, Section – Magnetism (MA)**

Prof. Dr. Johann Kroha
Institute of Physics, University of Bonn
Nussallee 12, 53115 Bonn
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Tentative Title: Competition between magnetic order and heavy-fermion disorder leading to quantum-criticality

The competition between exchange coupling favoring long-range magnetic order and so-called magnetic Kondo screening can be tuned to a state where the magnetic ordering temperature drops to zero and gives rise to exotic quantum-critical phenomena. Prof. Kroha has developed an overarching view of the dynamical interplay of the ordered and the heavy-fermion Kondo state that would resolve many of the existing controversies on the emergence of quantum-criticality. Since the quantum-critical state determines the magnetic properties of a system even far above zero Kelvin, his work is an interesting contribution at the interface between magnetism and low-temperature physics.

I therefore strongly support Prof. Kroha for an invited talk under the topic of "Electron Magnetism and Theory of Correlations"

Recent papers:

[1] A. Nejati, K. Ballmann, J. Kroha: Phys. Rev. Lett. **118**, 117204 (2017)
[2] A. Nejati, J. Kroha: J. Phys. Conf. Ser. **807**, 082004 (2017); arXiv:1612.06620
[3] A. Posazhennikova, M. Trujillo-Martinez, J. Kroha: Phys. Rev. Lett. **116**, 225304 (2016)
[4] J. Bork, Y.-H. Zhang, L. Diekhöhner L. Borda, P. Simon, J. Kroha, P. Wahl, K. Kern: Nature Physics **7**, 901 (2011)

Proposed by Manfred Fiebig