ALBA II - Workshop on Spintronics and synchrotron radiation

Report of Contributions

Contribution ID: **1** Type: **not specified**

Welcome

Monday, 17 May 2021 09:00 (15 minutes)

Presenter: ATTENKOFER, Klaus

Session Classification: Session I

Contribution ID: **2** Type: **not specified**

Time- and spatially-resolved magnetization dynamics induced by spin-orbit torques

Monday, 17 May 2021 09:15 (30 minutes)

Presenter: Prof. GAMBARDELLA, Pietro (Department of materials, ETH Zurich)

Session Classification: Session I

Contribution ID: **3** Type: **not specified**

Spin-orbit and magnetic proximity effect in van dar Waals Materials

Monday, 17 May 2021 09:45 (30 minutes)

Presenter: Prof. VALENZUELA, Sergio O. (ICN2)

Session Classification: Session I

Contribution ID: **4** Type: **not specified**

Symmetry and topology in epitaxial Co films and nanostructures

Monday, 17 May 2021 10:15 (30 minutes)

Presenter: Dr VOGEL, Jan (Neel Institute, CNRS Grenoble)

Session Classification: Session I

Contribution ID: **5** Type: **not specified**

Spintronics opportunities and directions at IMDEA Nanoscience: from Graphene-based spin-orbitronics to neuro nanotechnology applications

Monday, 17 May 2021 10:45 (30 minutes)

Presenter: Dr CAMARERO, Julio (IMDEA Nanoscience & Univ. Autonoma Madrid)

Session Classification: Session I

Contribution ID: **6** Type: **not specified**

Topological spin textures in thin films and multilayers

Monday, 17 May 2021 11:30 (30 minutes)

Presenter: Prof. CROS, Vincent (Unité Mixte de Physique CNRS/Thales)

Session Classification: Session II

Contribution ID: **7** Type: **not specified**

Some insights into topological charges in magnetism

Monday, 17 May 2021 12:00 (30 minutes)

Presenter: Prof. FERRER, Salvador (Alba synchrotron light source)

Session Classification: Session II

Contribution ID: **8** Type: **not specified**

Some examples of research on spintronics at ICMAB

Monday, 17 May 2021 12:30 (30 minutes)

Presenter: Dr FRONTERA, Carlos (Institut de Ciència de Materials de Barcelona (ICMAB/CSIC))

Session Classification: Session II

Contribution ID: **9** Type: **not specified**

ALBA ARPES Capabilities for investigating spintronic materials

Monday, 17 May 2021 13:00 (15 minutes)

Presenter: Dr TALLARIDA, Massimo (ALBA-CELLS)

Session Classification: Session II

Contribution ID: **10** Type: **not specified**

ALBA XMCD Capabilities for investigating spintronic materials

Monday, 17 May 2021 13:15 (15 minutes)

Presenter: Dr VALVIDARES, Manuel

Session Classification: Session II

Contribution ID: **11** Type: **not specified**

ALBA TXM Capabilities for investigating spintronic materials

Monday, 17 May 2021 14:30 (15 minutes)

Presenter: Dr ABALLE ARAMBURU, Lucia

Session Classification: Session III

Contribution ID: **12** Type: **not specified**

Pushing the limits of magnetic microscopy: time, space and analytics. Why and how?

Monday, 17 May 2021 14:45 (30 minutes)

Presenter: Prof. FRUCHART, Olivier (SPINTEC IRIG / CEA Grenoble)

Session Classification: Session III

Contribution ID: **13** Type: **not specified**

Coherent X-rays for three dimensional imaging of magnetic systems and their dynamics

Monday, 17 May 2021 15:15 (30 minutes)

Presenter: Dr DONNELLY, Claire (Cambridge University)

Session Classification: Session III

Contribution ID: **14** Type: **not specified**

New developments in synchrotron radiation based ferromagnetic resonance techniques

Monday, 17 May 2021 15:45 (30 minutes)

New developments in synchrotron radiation based ferromagnetic resonance techniques
David M. Burn1, Shilei Zhang2, Gerrit van der Laan1, Thorsten Hesjedal3
1Magnetic Spectroscopy, Diamond Light Source, Didcot, UK
2ShanghaiTech University, Shanghai, China
3Unversity of Oxford, Oxford, UK

The understanding of the magnetization dynamics of complex magnetic systems is the prerequisite for their controlled engineering, opening the door for the development of novel high-speed devices. A macroscopic understanding of the dynamic magnetization is commonly obtained through ferromagnetic resonance (FMR) measurements. Supported by micromagnetic simulations and theoretical modelling, some insight into their microscopic behavior is gained. X-ray detected ferromagnetic resonance (XFMR), on the other hand, provides a direct element-specific and time-resolved probe of the magnetization dynamics of technologically relevant layered spin valve and TMR structures [1,2]. Examples of XFMR measurements on such trilayer structures will be discussed.

To study the dynamics of topological magnetic systems, such as skyrmions, XFMR is unfortunately not suitable since the net magnetization probed by the x-ray beam vanishes. Magnetic skyrmions have shown a variety of novel features due to their unique topological nature, including new microwave excitation modes [3] such as clockwise and counterclockwise rotating, and breathing modes. Due to the periodic nature of the skyrmion lattice, resonant x-ray diffraction is very sensitive to probing this phase in, e.g., Cu2OSeO3 [4]. By combining resonant magnetic x-ray diffraction with FMR, diffractive FMR (DFMR) can give access to the real-space spin dynamics of a system. DFMR is a modal spectroscopy technique, potentially opening new pathways for the development of spintronic devices [5]. The technique will be introduced and discussed in the context of a cycloidal spin system.

References:

[1] G. van der Laan, J. Electron Spectrosc. Relat. Phenom. 220, 137 (2017).
[2] C. Klewe et al., Sync. Rad. News 33, 12 (2020).
[3] N. Nagaosa and Y. Tokura, Nat. Nanotechnol. 8, 899 (2013).
[4] S. L. Zhang et al., Phys. Rev. B 93, 21440 (2016).
[5] D.M. Burn et al., Nano Lett. 20, 345 (2020).

Presenter: Prof. HESJEDAL, Thorsten

Session Classification: Session III

Contribution ID: **15** Type: **not specified**

Spin Currents in Antiferromagnets

Monday, 17 May 2021 16:15 (30 minutes)

Presenter: Prof. HOFFMAN, Axel (a)

Session Classification: Session III

Contribution ID: **16** Type: **not specified**

Open Roundtable

Monday, 17 May 2021 16:45 (30 minutes)

Contribution ID: **17** Type: **not specified**

ALBA PEEM capabilities for investigating spintronic materials

Monday, 17 May 2021 14:15 (15 minutes)

Presenter: Dr FOERSTER, Michael Joachim Ulrich

Session Classification: Session III