in out-of-plane magnetized nanostructures with structural inversion asymmetry [1]. Current-induced domain wall motion (CIDWM) experiments were carried out in Ta\Co20Fe60B20\MgO nanowires and the DW motion is imaged by differential Kerr microscopy technique. We find that the velocity of the DW is strongly affected by the presence of a longitudinal magnetic field, resulting in a different velocity for the up-down and down-up domain walls at fixed current density and magnetic field. Such results are interpreted by the spin-Hall effect-torque model, where the chirality of the domain walls is fixed by the DMI at the [heavy metal]\ferromagnet interface. The DMI is found to depend on the B diffusion to the Ta interface, which is a consequence of the annealing process used to obtain the desired perpendicular magnetic anisotropy. [1] R. Lo Conte et al., arXiv: 1409.3753 (2014).

15 min. break

MA 9.7 Mon 17:15 H 0112

Spin-transfer torque effects in the dynamic forced response of the magnetization of nanoscale ferromagnets in superimposed ac and dc bias fields in the presence of thermal agitation — •William Coffey[1], Yuri Kalmykov[2], Sergey Titov[3], Declan Byrne[1], and Jean Wegrowe[4] — [1]Department of Electronic and Electrical Engineering, Trinity College, Dublin 2, Ireland — [2]Université de Perpignan Via Domitia, Laboratoire de Mathématiques et Physique, F-66860, Perpignan, France — [3]Kotelnikov Institute of Radio Engineering and Electronics of the Russian Academy of Sciences, Vvedenskii Square 1, Fryazino, Moscow Region, 141120, Russia — [4]Laboratoire des Solides Irradiés, Ecole Polytechnique, 91128 Palaiseau Cedex, France

Spin-transfer torque (STT) effects on the stationary forced response of nanoscale ferromagnets driven by an ac magnetic field of arbitrary strength in the presence of thermal fluctuations are investigated via the generic nanopillar model of a spin-torque device. The STT effects are treated via the magnetic Langevin equation generalized to include the Slonczewski STT term thereby extending the statistical moment method to the forced response. Hence, the dynamic susceptibilities, frequency-dependent dc magnetization, dynamic hysteresis loops, etc. are evaluated for arbitrary ac field direction, strength and spin polarization, highlighting STT effects on both the low-frequency thermal relaxation processes and the high-frequency ferromagnetic resonance, demonstrating a pronounced dependence of such characteristics on the spin polarization current, allowing interpretation of STT experiments.

MA 9.8 Mon 17:30 H 0112

Lifetime of high-energy magnons in ultrathin FePd(001) films — •Huajun Qin[1], Khalil Zakeri Lori[1], Arthur Ernst[1,2], Leonid M. Sandratskii[1], Pawel Buczek[1], Alberto Marmodoro[1], Tzu-Hung Chuang[1], Yu Zhang[1], and Jürgen Kirschner[1,3] — [1]Max-Planck-Institut für Mikrostrukturphysik, Weinberg 2, 06120 Halle, Germany — [2]Wilhelm Ostwald Institut für Physikalische und Theoretische Chemie, Universität Leipzig, Linnéstr. 2, 04103 Leipzig, Germany — [3]Institut für Physik, Martin-Luther-Universität Halle-Wittenberg, 06120 Halle, Germany

The lifetime of high-energy magnons in itinerant ferromagnets is very short due to their decay into the single-particle Stoner excitations. This damping mechanism is commonly referred to as Landau damping.

We present the results of our investigations of magnons' lifetime in ultrathin FePd(001) alloy films grown on Pd(001), obtained by means of spin polarized electron energy loss spectroscopy. It is observed that the magnons' lifetime in ultrathin FePd alloy films is rather long compared to the one in Fe films grown on other substrates [1]. First-principles calculations revealed that the long magnons' lifetime has its origin in the peculiar electronic hybridizations between Fe and Pd atoms. These electronic hybridizations lead to the suppression of the relaxation channels of high-energy magnons and result in a long magnons' lifetime. We anticipate that the long lifetime of magnons in FePd films makes them as good candidates for terahertz magnonics.

[1] Y. Zhang, T.-H. Chuang, Kh. Zakeri, and J. Kirschner, PRL **109**, 087203 (2012).

MA 9.9 Mon 17:45 H 0112

Spin-orbit torques in $L1_0$-FePt/Pt thin films driven by electrical and thermal currents — •Guillaume Géranton, Frank Freimuth, Stefan Blügel, and Yuriy Mokrousov — Peter Grünberg Institut and Institute for Advanced Simulation, Forschungszentrum Jülich and JARA, 52425 Jülich, Germany

Using the linear response formalism for the spin-orbit torque (SOT) we compute from first principles the SOT in a system of two layers of $L1_0$-FePt(001) deposited on an fcc Pt(001) substrate of varying thickness [1]. We predict SOTs of the same order of magnitude than the ones computed in Co/Pt thin films [2]. Moreover, the good matching of the lattice constants of Pt and $L1_0$-FePt(001) allows these films to be grown epitaxially. The comparison of theory with experiment would therefore be simplified and fruitful to understand the underlying mechanisms that contribute to SOTs in thin films. Taking the system at hand as an example, we also compute the values of the thermal spin-orbit torque (T-SOT). We predict that the gradients of temperature that can be experimentally created in this type of systems will cause a detectable torque on the magnetization.

We gratefully acknowledge funding under the HGF-YIG programme VH-NG-513 and SPP 1538 of DPG.

[1] G. Géranton, F. Freimuth, S. Blügel, Y. Mokrousov (2014), arXiv:1409.1767

[2] F. Freimuth, S. Blügel, Y. Mokrousov, PRB **90**, 174423 (2014)

MA 9.10 Mon 18:00 H 0112

Current-induced spin torque resonance of a magnetic insulator — •Michael Schreier[1,2], Takahiro Chiba[3], Arthur Niedermayr[1,2], Johannes Lotze[1,2], Hans Huebl[1,4], Stephan Geprägs[1], Saburo Takahashi[3], Gerrit E. W. Bauer[3,5,6], Rudolf Gross[1,2,4], and Sebastian T. B. Goennenwein[1,4] — [1]Walther-Meißner-Institut, Bayerische Akademie der Wissenschaften, Garching, DE — [2]Physik-Department, TU München, Garching, DE — [3]Institute for Materials Research, Tohoku University, Sendai, JP — [4]Nanosystems Initiative Munich, DE — [5]WPI Advanced Institute for Materials Research, Tohoku University, Sendai, JP — [6]Kavli Institute of NanoScience, Delft University of Technology, Delft, NL

We report the observation of spin transfer torque induced ferromagnetic resonance in the ferromagnetic insulator yttrium iron garnet (YIG). An alternating current at gigahertz frequencies in the Pt layer of a YIG/Pt sample generates Oersted and effective anti damping (spin transfer) torque fields inducing ferromagnetic resonance in the YIG. This can be observed as DC spin pumping and spin Hall magnetoresistance rectification voltages. To disentangle the two excitation and detection processes we investigate YIG layers of different thickness, which impacts the magnitude of the effective damping torque field. In ultrathin yttrium iron garnet films the magnitude of the spin transfer torque actuated magnetization dynamics is substantially enhanced and dominates that generated by the Oersted field. We discuss the determination of spurious effects and present a quantitative analysis. Support by the DFG through SPP1538 is gratefully acknowledged.

MA 9.11 Mon 18:15 H 0112

Magnetic excitations in Co films on Ir(001) and Rh(001) substrates: The role of interfacial electronic hybridization — •Ying-Jiun Chen[1], Khalil Zakeri Lori[1], Arthur Ernst[1], Huajun Qin[1], Tzu-Hung Chuang[1], Yang Meng[1], and Jürgen Kirschner[1,2] — [1]Max-Planck-Institut für Mikrostrukturphysik, Weinberg 2, 06120 Halle, Germany — [2]Institut für Physik, Martin-Luther-Universität Halle-Wittenberg, 06120 Halle, Germany

The hybridization between the electronic states of an ultrathin magnetic film and the substrate is a notable effect, which modifies the magnetic properties of the film. In order to address this effect we have investigated the magnetic properties and high-energy magnetic excitations in ultrathin Co films, with a thickness of 1-2 monolayer (ML), grown on Ir(001) and Rh(001). The magneto-optical Kerr effect measurements revealed that the magnetic easy axis for both systems is lying in the film plane. It was found that the in-plane magnetic anisotropy energy of the Co films grown on the Ir(001) surface is rather large, compared to the one of the Co films on Rh(001). The high-energy magnetic excitations were investigated by means of spin-polarized electron energy loss spectroscopy. It was observed that the magnon dispersion relation for both Co/Ir(001) and Co/Rh(001) systems is nearly the same. Combined with first-principles calculations, we discuss how the interfacial hybridization of the Co_{3d}-Ir_{5d} and Co_{3d}-Rh_{4d} electronic states influences the magnetic anisotropy energy and high-energy magnetic excitations in these systems.

MA 9.12 Mon 18:30 H 0112

Vortex Core Motion driven by Thermal Spin Transfer Torque — •Michael Vogel[1], Jean-Yves Chauleau[1], Claudia Mewes[2], Tim Mewes[2], and Christian Back[1] — [1]Institut für Experimentelle und Angewandte Physik, Universität Regensburg, Regensburg, Ger-