13th International Symposium on Hysteresis Modeling and Micromagnetics (HMM 2023) June 4–7. 2023 – TU Wien

https://www.asc.tuwien.ac.at/hmm2023/

The biennial International Symposium on Hysteresis Modeling and Micromagnetics (HMM) is an interdisciplinary forum for discussion of the most recent advancements in the fields of hysteresis modeling and micromagnetics. It aims to bring together scientists with various backgrounds (e.g., mathematicians, physicists, engineers, and materials scientists) to exchange ideas and to present new approaches and results.

The 13th edition of HMM takes place from June 4 to June 7, 2023 at TU Wien (Vienna, Austria). The support of

- TU Wien,
- the Austrian Science Fund (FWF) through the Special Research Program (SFB) *Taming complexity in partial differential systems* (grant F65),
- the research platform MMM Mathematics-Magnetism-Materials of the University of Vienna,
- the Vienna Center for Partial Differential Equations (ViennaPDE),
- the Vienna Convention Bureau,
- and the City of Vienna (Stadt Wien Kultur)

is thankfully acknowledged.









Der Wissenschaftsfonds.





MEETING DESTINATION VIENNA NOW • TOGETHER

Conference venue

HMM 2023 takes place in the following three locations:

- The welcome reception takes place on Sunday, June 4 at 18:30 in the *Stadtsenatssitzungssaal* of Vienna City Hall (address: Lichtenfelsgasse 2, 1010 Vienna).
- The scientific program (oral presentations and poster session) takes place from Monday, June 5 at 9:00 to Wednesday, June 7 at 16:00 in the *Kuppelsaal* of TU Wien (address: Karlsplatz 13, 1040 Vienna).
- The conference dinner takes place on Tuesday, June 6 at 19:30 at the restaurant Stöckl im Park (address: Prinz-Eugen-Straße 25, 1030 Vienna).



Internet access

TU Wien participates in the *eduroam* program, therefore HMM participants can gain internet access connecting to the WLAN *eduroam* using the personal account from their home institution. Participants without access to *eduroam* can get login data for the WLAN *tunet* at the registration desk.

Program overview

	Sun, June 4	Mon, June 5		Tue, June 6		Wed, June 7	
		08:30	Registration				
		09:00	Opening				
			Chubykalo-Fesenko	09:00	Fabian	09:15	Coffee break
				09:45	Adams		
		10:00 10:15	Bjørk Coffee break	10:00 10:15	Iglesias Coffee break	10:00	James
						10:45	Gavioli
						11:00	Appino
		11:00	Di Fratta	11:00	Schroers	11:15	Rahmanović
						11:30	Cardelli
		11:45	Basso	11:45	Kim	11:45	Mazza
		12:00	Kraft	12:00	Leliaert	_	
		12:15	Korniienko	12:15	Serpico		
				12:30	Conference photo	12:00	Lunch break
		12:30	Lunch break	12:35	Lunch break		
						14:00	Massouras
						14:15	d'Aquino
						14:30	Slavin
		14:30	Ono	14:30	Krejčí	14:45	Kákay
		15 15	D.I. II.	15 15		15:00	Koraltan
		15:15	Bolyachkin	15:15	Roubicek	15.15	Hartal
		15:30	Dengina	15:30	Nonteiro Cuzzette	15:15	Hertei
		15:45	Gusakova	15:45		16.00	Closing
		10:00	Jørstau	10:00	All	10:00	Closing
		16:15	Coffee break	16:15	Coffee break	16:15	Coffee break
		17:00	Yang	17:00	Dorn		
		17:15	Visone	17:15	Neslušan		
		17:30	Hrkac	17:30	Hasičić		
		17:45	ExI	17:45	Klein		
18:30	Registration and welcome reception	18:00	Poster session and wine reception				
	(Vienna City Hall)			19:30	Conference dinner (Stöckl im Park)		

Detailed program

Scan the QR codes to see the abstracts.

Sunday, June 4, 2023

18:30-	Registration and welcome reception at Vienna City Hall

Monday, June 5, 2023 – Morning

08:30-09:00		Registration	
00.00 00.15		Dirk Praetorius	
09:00-09:15		Opening	
	Session I	I: Novel aspects in micromagnetics I (Chair: Dieter Suess)	
		Oksana Chubykalo-Fesenko	
09:15–10:00		Modeling of magneto-thermo dynamics	
		Rasmus Bjørk	
10:00–10:15		Accuracy of the demagnetization tensor	
10:15-11:00		Coffee break	
	Session II:	Novel aspects in micromagnetics II (Chair: Michele Ruggeri)	
		Giovanni Di Fratta	
11:00–11:45		Curved thin-film limits of chiral Dirichlet energies	
		Vittorio Basso	
11:45-12:00		Boundary conditions for micromagnetism with spin currents	
		Robert Kraft	
12:00-12:15		Parallel-in-time integration of the LLG with the parallel full	
		approximation scheme in time and space	
		levgeniia Korniienko	
12:15–12:30		Zeeman torque dynamics induced by ultrashort terahertz radiation	
12:30-14:30		Lunch break	

Monday, June 5, 2023 – Afternoon

Session III: Applied micromagnetics (Chair: Rasmus Bjørk)					
14:30–15:15		Kanta Ono Large-scale micromagnetic simulation for permanent magnets and soft-magnetic materials			
15:15–15:30		Anton Bolyachkin Tomography-based micromagnetic simulations of Nd-Fe-B hot-deformed magnets			
15:30–15:45		Ekaterina Dengina Micromagnetic simulations of hot-deformed Nd-Fe-B magnets after grain boundary diffusion process			
15:45–16:00		Daria Gusakova Bloch-Point micromagnetic behavior in cylindrical nanowire: from simulation to experimental evidence			
16:00–16:15		Nils Petter Jørstad Micromagnetic modeling of SOT-MRAM dynamics			
16:15-17:00		Coffee break			
	Session IV: Machine learning (Chair: Harald Özelt)				
		Vanguiuna' Vang	EI 9325248791EI		
17:00–17:15		Data-driven multiscale hysteresis simulations of samarium-cobalt permanent magnets			
17:00–17:15		Tangywei Yang Data-driven multiscale hysteresis simulations of samarium-cobalt permanent magnets Ciro Visone Hysteresis compensation by deep learning algorithms			
17:00–17:15 17:15–17:30 17:30–17:45		Tangywei Yang Data-driven multiscale hysteresis simulations of samarium-cobalt permanent magnets Ciro Visone Hysteresis compensation by deep learning algorithms Gino Hrkac Graph theoretic modelling of rare earth transition material properties			
17:00–17:15 17:15–17:30 17:30–17:45 17:45–18:00		Tangywei Yang Data-driven multiscale hysteresis simulations of samarium-cobalt permanent magnets Ciro Visone Hysteresis compensation by deep learning algorithms Gino Hrkac Graph theoretic modelling of rare earth transition material properties Lukas Exl Computational micromagnetics with physics-informed neural networks			

Tuesday, June 6, 2023 – Morning

Session V: Micromagnetics and atomistic simulations (Chair: Oksana Chubykalo-Fesenko)				
09:00–09:45		Karl Fabian Micromagnetics and hysteresis in rock magnetism		
		Michael Philipp Adams		
00.45-10.00		Atomistic simulations of the magnetic neutron scattering		
09.45 10.00		from nanoparticles along the hysteresis loop: effects of		
		surface anisotropy		
		Òscar Iglesias		
10:00-10:15		Tunable magnetic equilibrium configurations in dipolar helices		
10:15-11:00		Coffee break		
	Ses	sion VI: Skyrmions and vortices (Chair: Claas Abert)		
		Bernd Schroers		
11:00–11:45		Gauge theory and dynamics of chiral skyrmions		
		Joo-Von Kim		
11:45-12:00		Resonant dynamics of three-dimensional skyrmionic textures		
		in thin film multilayers		
		Jonathan Leliaert		
12.00-12.12		Direct observation of temperature dependent vortex dynamics		
12.00 12.10		in a La0.7Sr0.3MnO3 micromagnet		
		Claudio Serpico		
12:15-12:30		Bistability and bifurcations in the dynamics of coupled		
		identical spin-torque vortex oscillators		
12:30-12:35		Conference photo		
12:35-14:30		Lunch break		

Tuesday, June 6, 2023 – Afternoon

	Ses	ssion VII: Hysteresis modelling I (Chair: Gino Hrkac)	
14:30–15:15		Pavel Krejčí Preisach energy potentials in models for magnetostriction	
		Tomáš Roubíček	
15:15–15:30		Hysteretic ferro-paramagnetic phase transition in finitely-strained viscoelastic media	
		Giselle A. Monteiro	
15:30–15:45		Approximation error bounds for rate-dependent Prandtl–Ishlinskii compensators	
		Saverio Guzzetta	
15:45–16:00		Simulation of core losses evaluation in EMI filters using the Jiles–Atherton hysteresis model	
		Qais Ali	
16:00–16:15		Benchmarking for systematic coarse-grained micromagnetics	
16:15-17:00		Coffee break	
	Ses	ssion VIII: Magnetomechanics (Chair: Joo-Von Kim)	
		Christian Dorn	
17:00–17:15		Barkhausen noise investigation using a micro-magneto-mechanically coupled material model	
		Miroslav Neslušan	
17:15–17:30		Barkhausen noise in soft magnetic composites	
		Mehrija Hasičić	
17:30–17:45		The effect of strain on the magnetization process	
		Olaf Klein	
17:45–18:00		On a model for a magneto mechanical device: forward and inverse uncertainty quantification	
10.00		Optional meeting at the main entrance of TU Wien	
19.00		(for those who want to walk together to the restaurant, a 15-m	iinute walk)
19:30-		Conference dinner at Stöckl im Park	

Wednesday, June 7, 2023 – Morning

09:15-10:00		Coffee break	
	Sessie	on IX: Hysteresis modelling II (Chair: Thomas Schrefl)	
10:00-10:45		Richard D. James Design of materials with low magnetic hysteresis: The unexpected role of magnetostriction	
	EL SPACHEN MARKE	Chiara Gavioli	
10:45-11:00		Controllability of PDEs with hysteresis	
		Carlo Appino	
11:00–11:15		Analytic approach to magnetisation reversal	
		Ermin Rahmanović	
11:15–11:30		Modelling of unit differential reversal curves in the G2E hysteresis model	
		Ermanno Cardelli	
11:30–11:45		Hysteresis modelling in additively manufactured FeSi magnetic cores	
		Luciano Mazza	
11:45–12:00		Evaluating spintronic Ising machines for solving Max-Cut	
12:00-14:00		Lunch break	

Wednesday, June 7, 2023 – Afternoon

	Session X: Magnonics (Chair: Andrii Chumak)	
14:00-14:15	Maryam Massouras Simulated time-resolved response of parametric spin wave excitations in YIG disks	
14:15–14:30	Massimiliano d'Aquino Micromagnetic simulation of inertial spin waves in ferromagnetic nanodots	
14:30–14:45	Andrei Slavin Amplification of an isolated magnon mode in a rapidly cooling gas of magnons	
14:45-15:00	Attila Kákay Finite-element micromagnetic modeling of spin-wave propagation with the open-source package TetraX	
15:00–15:15	Sabri Koraltan Current-driven emission of spin waves from magnetic vortices	
15:15–16:00	Riccardo Hertel High-frequency magnetization dynamics in three-dimensional interconnected nanowire geometries	
16:00-16:15	Michele Ruggeri Closing	
16:15-17:00	 Coffee break	

Poster session



Claas Abert

Novel nodal finite-difference micromagnetic code for distributed systems

Sergiu Arapan

The role of the interface and ferromagnetic alloying on the interlayer exchange coupling





Vittorio Basso

Disentangling electric field effect on spin waves in ferromagnetic insulators

Mario Bendra

Simulation of spin-torque and magnetization dynamics in STT-MRAM multi-level cells





Zuzana Birčáková

Application of the Jiles–Atherton model to iron-based soft magnetic composite materials and interpretation of their magnetic properties in terms of model parameters

Florian Bruckner

magnum.np - A PyTorch based GPU enhanced finite difference micromagnetics





Oksana Chubykalo-Fesenko

A high-temperature micromagnetic investigation of domain-wall dynamics based on the inverse Faraday effect

Amil Ducevic

 $\label{eq:main_state} Multiscale \ {\tt approach} \ {\tt toward} \ {\tt numerically} \ {\tt modelling} \ {\tt soft} \ {\tt magnetic} \ {\tt composites}$



Riccardo Ferrero

Modelling of magnetic nanoparticle clusters and effects on hyperthermia properties

Riccardo Ferrero

A 3D micromagnetic solver with time integration based on the Cayley transform



Johann Fischbacher

Micromagnetic modelling of soft-in-hard FeCo-FePt nanocomposites

Peter Flauger

Investigation of possible origins of the back-hopping effect in MTJs using macrospin simulations with STT obtained from a free electron model





Markus Gattringer

Micromagnetically integrated numerical model of spin pumping based on spin diffusion

Anna Giordano

A micromagnetic study of the parametric resonance response driven by voltage-controlled magnetic anisotropy





Markus Gusenbauer

Magnetization reversal of large granular magnetic materials

Tomas Hadamek

Numerical study of two-terminal SOT-MRAM





Santiago Helbig

Hysteresis losses of simulated magnetic nanoparticles with coupled magnetic and mechanical processes

Oleksandr Hrushko

Some approaches for estimating thermal residual stresses in a polycrystalline Nd2Fe14B magnet





Òscar Iglesias

Taming the influence of dipolar interactions in nanoparticle assemblies for magnetic hyperthermia

Marko Jesenik

Analytical hysteresis model made on the basis of measured data



Joo-Von Kim

Mode-resolved micromagnetics simulations for nonlinear spin wave processes in confined systems

Alexander Kovacs

Finite Hex element adaptive mesh refinement of demagnetizing field computation



Aphrodite Ktena

Magnetic anomaly detection of moving objects

Jérémy Létang

Extraordinary magnetoresistance in a 2-terminal structure





Sumit Maity

Domain wall dynamics in cubic magnetostrictive materials subject to Rashba effect and nonlinear dissipation

Sumit Maity

Strain-mediated motion of magnetic domain walls in transversely isotropic hexagonal magnetostrictive materials with Rashba effect and dry-friction dissipation





Hywel Normington

A decoupled, convergent and fully linear algorithm for the Landau–Lifshitz–Gilbert equation with magnetoelastic effects

Harald Özelt

Machine learning based optimization of hard-/soft magnetic nanostructures







Santa Pile

Spin-wave behavior in single and double rectangular Ni80Fe20 microstrips: micromagnetic simulations vs TR-STXM direct imaging

Bernhard Pruckner

Impact of spin-flip length in dsMTJ spacer layers on switching performance





Maximilian Reichel

A numerical study on NdFeB magnets produced by severe plastic deformation

Klaus Roppert

Adaptions of an energy-based vector hysteresis model for vanishing rotational losses



Cristian Rotarescu

The effect of the magnetoelastic anisotropy on the magnetization processes in rapidly quenched amorphous nanowires

Claudio Serpico

Analysis of spin-torque driven magnetization dynamics in saturated disks





Evelyn Pratami Sinaga

Detecting skyrmions using magnetic small-angle neutron scattering

Jiajun Sun

The magneto-acoustic interaction in ferromagnetic materials induced by Einstein–De Haas effect





Andrey Voronov

Inverse-design micromagnetic simulation solver based on PyTorch framework

Clemens Wager

Active learning scheme vs conventional optimization - developing a Python framework





Hao Zhang

XRD+ prediction model using SVM and ANN

