wopm 2024
Workshop on Optically Pumped Magnetometers

Scientific sessions and posters

Workshop on Optically Pumped Magnetometers, Saturday to Sunday, August 24th and 25th. (Sydney, Australia, Satellite to Biomag 2024)

Scientific program committee

Peter Schwindt (Chair, Sandia National Laboratories)
Svenja Knappe (University of Colorado & Fieldline Inc)
Tetsuo Kobayashi (Kyoto University)
Lauri Parkkonen (Aalto University & MEGIN)
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			Saturday, 24.08.2024		
Opening		09:00			00:10
Session 1					
Basic OPM Research	1	09:10	Quantum magnetic gradiometer with entangled twin light beam	Guzhi Bao, School of Physics and Astronomy and Tsung-Dao Lee institute, Shanghai, China	00:30
	2	09:40	An improved closed-loop Herriott-cavity-assisted Xe isotope comagnetometer	Chunqi Yuan, Department of Precision Machinery and Precision Instrumentation, University of Science and Technology of China, Hefei, China	00:20
	3	10:00	Observation of spontaneous polarization and light narrowing with ultra-long polarization lifetime paraffin-coated cells	Shuyuan Chen, School of Electronics, Peking University, Beijing, China	00:20
	4	10:20	Mode Analysis of Spin Field of Thermal Atomic Ensembles	Weiyi Wang, School of Instrumentation Science and Opto-electronics Engineering, Beihang University, Beijing, China	00:20
Coffe break		10:40			00:30
Session 2					
Biomagnetic Applications	5	11:10	Improving the efficacy of the signal space separation method for OPM-MEG data	Niall Holmes, Sir Peter Mansfield Imaging Centre, School of Physics and Astronomy, University of Nottingham, Nottingham, UK	00:20
	6	11:30	Using optically pumped magnetometers for paediatric MEG: experiences from SickKids	Natalie Rhodes, Neurosciences & Mental Health, SickKids Research Institute, Toronto, Canada	00:20
	7	11:50	Miniaturizing MEG: The Future of Epileptic Signal Localization	Tyrell Pruitt, Department of Radiology, UT Southwestern Medical Center, Dallas, USA	00:20
Lunch break		12:10			01:35
Session 3					
Novel OPM designs	8	13:45	An Alkali-Noble SERF co-magnetometer not reliant on passive compensation	Ankit Papneja, Australian National University, Canberra, Australia	00:30
	9	14:15	Optically pumped vector magnetometer with freely definable sensitive axis for use within Earth's magnetic field	Thomas Schönau, Leibniz Institute of Photonic Technology, Jena, Germany	00:20
	10	14:35	A free-induction-decay scalar magnetometer for precision measurements	Xueke Wang, Department of Precision Machinery and Precision Instrumentation, University of Science and Technology of China, Hefei, China	00:20
	11	14:55	Functionalized vapor cells and miniaturized biplanar coils for mass-producible miniature atomic sensors	Kostas Mouloudakis, ICFO - The Barcelona Institute of Science and Technology, Castelldefels, Spain	00:20
Coffe break + Photo		15:15			00:35
Poster Session		15:50			02:00
End		17:50			

			Sunday, 25.08.2024		
Session 4					
Sponsor talks	*i*	09:00	QuSpin		00:05
	ii	09:05	Mag4Health		00:05
	iii	09:10	TwinLeaf		00:05
Basic OPM Research	12	09:15	Cavity-enhanced atomic magnetometer for micro-bio-magnetic measurements	Maria Hernandez Ruiz, ICFO, Castelldefels (Barcelona), Spain	00:30
	13	09:45	A preliminary study of an ultra-wide range Fast Field Cycling (FFC) NMR relaxometry based on compact atomic magnetometer array	Qianyue Qu, National Key Laboratory of Magnetic Resonance Spectroscopy and Imaging, Chinese Academy of Sciences, Wuhan, China	00:20
,	14	10:05	Atomic Microwave Spectrum Analyzer based on MEMS Vapor Cells	Yongqi Shi, Department of Physics, University of Basel, Basel, Switzerland	00:20
	15	10:25	High-order atomic coherences for the elimination of nonlinear Zeeman splitting error in atomic magnetometers	Artur Mozers, Laser Centre, University of Latvia, Riga, La	00:20
Coffe break		10:45			00:30
Session 6					
Applications	16	11:15	Biplanar coil cancellation system for OPM-MEG using PCB	Mainak Jas, A.A. Martinos Center for Biomedical Imaging, Charlestown, USA	00:20
	17	11:35	A compact OPM-MEG system	Mikael Grön, Department of Neuroscience and Biomedical Engineering, Aalto University, Finland	00:20
	18	11:55	Optical magnetometry using NV centers in diamond for neurosurgical applications	Ara Rahimpour, Johannes Gutenberg-Universität Mainz, Mainz, Germany	00:20
	19	12:15	Application of UnShielded SERF Atomic Magnetometers in Earth Exploration	Zhou Yuanrui, College of Instrumentation and ElectricalEngineering, Jilin University, Changchun, China	00:20
Closing remarks		12:35			00:10
Lunch break		12:45			01:45
Tutorial					
		14:30	How does an OPM work and what parameters are different from a SQUID magnetometer?	Peter Schwindt, Svenja Knappe	00:40
		15:10	How do you set up your OPM-MEG experiment for success and what do you need to consider when analyzing OPM data?	Lauri Parkkonen, Samu Taulu, Robert Oostenveld	01:00
Break		16:10			00:20
		16:30	How do you set up your OPM-MEG experiment for success and what do you need to consider when analyzing OPM data?	Mainak Jas, Teresa Cheung	00:40
		17:10	What can we see with OPMs beyond the cortex?	George O'Neill, Sarang Dalal	00:40
End		17:50			

			Poster		
Basic OPM research	1		Fabrication and characterization of antirelaxation coated multipass cells	Xiangyu Li, Institute of Modern Physics, Fudan University, Shanghai, China	
	2		Attempt at Multi-Point Measurement Using M-Sequence Modulation of Pump Beams in Optically Pumped Magnetometers	Yosuke Ito, Kyoto University, Kyoto, Japan	
	3		Shot-noise-limited optical polarimetry with Decoupled spin alignment and magnetism	Xing Heng, School of Instrumentation and Optoelectronic Engineering, Beihang University, Beijing, China	
Novel OPM designs	4		Integrated optomechanical magnetometer	Fernando Gottardo, The University of Queensland, Brisbane, Australia	
	5		Quantum-enhanced Electrometer based on Microwave-dressed Rydberg Atoms	Shuhe Wu, School of Physics and Astronomy and Tsung-Dao Lee institute, China	
	6		Implementation of an atomic free induction decay magnetometer targeted at medical diagnostics	Philipp Neufeld, Robert Bosch GmbH, Advanced Technologies and Micro Systems, Renningen, Germany	
	7		A Low-frequency Sensitivity Enhancement Method for Compact Magnetic-field-modulation-free SERF Magnetometers	Ma Xiao, Peking University, Beijing, China	
	8		Single-Beam Vector Atomic Magnetometer using Parametric Modulation	Ye-Jin Yu, Department of Physics, Pusan National University, Busan, Korea	
	9		Ultra-sensitive triaxial zero-field atomic magnetometry	Shuying Wang, School of Instrumentation and Optoelectronic Engineering, Beihang University, Beijing, China	
	10		Atomic Spin Relaxation Measurement Instrument for Different Atomic Vapor Cells: Various Types of Relaxation Time Measurements	Zishan Xu, Department of Precision Instrument, Tsinghua University, Beijing, China	
	11		In-situ measurement method of diffusion constant in SERF atomic magnetometer	Yao Guo Wang, Beihang University, Beijing, China	
	12		An absolute residual magnetic field order evaluation method of SERF atomic magnetometer	Di Zhan, Beihang University, Beijing, China	
	13		In-situ Self-Calibration of a SERF Atomic Magnetometer	Yue Xin, Department of Precision Instruments, Tsinghua University, Beijing, China	
OPM applications - biomagnetic	14		Toward an Optically Pumped Magnetometer Magnetoencephalography System with Full Head Coverage	Peter Schwindt, Sandia National Laboratories, Albuquerque, USA	
	15		A textile cap for simultaneous measurements of EEG and OPM-MEG	Paul Anders, Physikalisch-Technische Bundesanstalt, Berlin, Germany	

	16		Optimizing pre-processing for magnetometer arrays applied in multivariate pattern analysis	Yulia Bezsudnova, University of Birmingham, Birmingham, UK	
	17		Conventional and on-scalp measurements of MEG signals from the human cerebellum during self-paced saccades	Santeri Ruuskanen, Department of Neuroscience and Biomedical Engineering, Aalto University, Finland	
	18		The advantage of triaxial OPM-MEG in imaging temporal-correlated sources: A simulation study	Yixuan Yang, Center for MRI Research, Peking University, Beijing, China	
	19		Test-retest reliability of resting-state human brain microstates with OPM-MEG	Ziyue Huang, Peking University, Beijing, China	
	20		Signal-to-noise ratio of event-related responses: OPM vs. SQUID sensors	Seppo Ahlfors, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital and Harvard Medical School, Boston, USA	
	21		Optimizing the configurations of OPM-MCG for myocardial ischemia detection	Tingyue Li, Peking University, Beijing, China	
	22		Miniaturising Magnetic Field Compensation Systems for Quantum Devices	Alister Davis, School of Physics and Astronomy, University of Nottingham, Nottingham, UK	
	23		Transportable magnetic control environment for imaging infants using Optically Pumped Magnetometers (OPMs)	Christopher Morley, School of Physics and Astronomy, University of Nottingham, Nottingham, UK	
	24		Magnetomyography Targeted Performance Characterization of Commercial OPMs	Simon Nordenström, Physikalisch-Technische Bundesanstalt, Berlin, Germany	
OPM applications - other	25		Mobile total field optically pumped magnetometers for navigation	Daniel Nightingale, University of Sussex, Brighton, United Kingdom	
	26		Magnetic field measurement over 100 kHz using 4He-OPM towards ultra-low-field MRI	Yudai Fujimoto, Technology Research Laboratory, Shimadzu Corporation, Soraku-gun, Kyoto, Japan	
	27		Tabletop magnetic field scanning system based on OPAM and 3D current density reconstruction from scanned magnetic fields	Jeong Hyun Shim, Quantum Magnetic Sensing Group, Korea Research Institute of Standards and Science, Daejeon, Korea	
	28		Chip-scale magnetic resonance imaging via atomic magnetometers	Kostas Mouloudakis, ICFO – The Institute of Photonic Sciences, Barcelona Spain	