



The Multinational Power Electronics Association

PSMA Magnetics Committee Meeting

August 14TH 2023

Ed Herbert, George Slama, Matt Wilkowski
Committee Chairs



PSMA is a not-for-profit organization and a CO-SPONSOR OF APEC



PSMA Magnetics Committee Meeting Agenda

August 14, 2023

- Introductions
- 2024 Workshop Planning
- 2024 Industry Session Planning
- Power Technology Roadmap
- Special Projects
 - Core Loss Database
 - Need to rank and identify champion
 - Electrical parameters of magnetic materials
 - Steinmetz Like Approximation
 - Electrical parameters of magnetic materials
 - Propagation in magnetic materials
 - Current driven core loss testing
 - Spice model
- Magnetics Committee Forum on PSMA Website



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PSMA Magnetics Committee Meeting Agenda – Workshop Planning

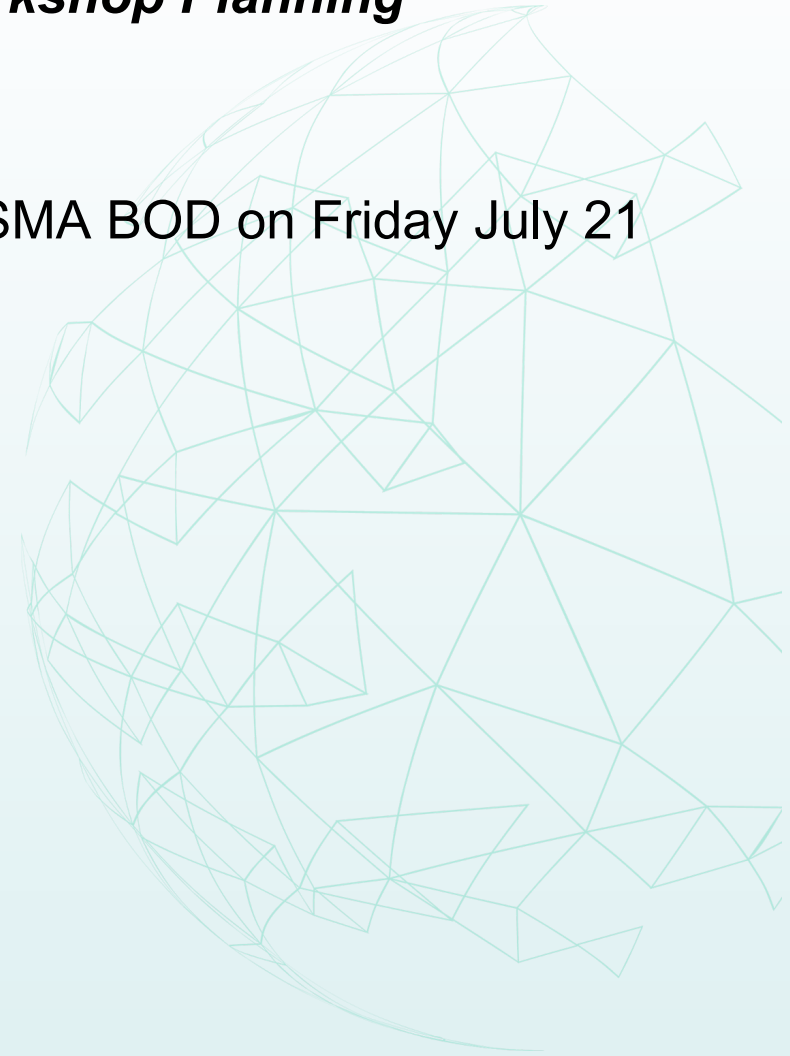
August 14, 2023

- Workshop Themes
 - Overall: Design of Optimal Magnetics Across Applications and Environments
 - Morning Session: Design and Optimization of Magnetics for Different Applications
 - Afternoon Session: Thermal design and other special issues such as insulation, partial discharge, etc.,
 - Tech Demos
- Industry Session Theme
 - Circuit and Construction Simulation and Modelling of Magnetic Components
- Propose not to cover core loss modelling for the 2024 workshop due to
 - Survey results requesting core loss modelling was based on a survey on Saturday March 18 however there were two PSMA Magnetics Committee related activities at APEC 2023 after the survey
 - George Slama Professional Education Seminar on Sunday March 19 – Core Loss Data for Everyone
 - Magnetics Committee Industry Session on Tuesday March 21 – Core Loss Measurements For Different Materials and Excitations
 - MagNet Activities will may results in some presentation and sessions on core loss modelling at APEC 2024
 - May have some tech demos related to MagNet

PSMA Magnetics Committee Meeting Agenda – Workshop Planning

August 14, 2023


- Special Projects Nomination Proposal accepted at PSMA BOD on Friday July 21
- Tentative Agenda - Update
- Workshop Banner
- Workshop on PSMA Website
- Workshop on APEC website



PSMA Magnetics Committee Meeting Agenda – Workshop Planning



August 14, 2023

- From 2023 Workshop



Power Magnetics @ High Frequency Workshop

PSMA Magnetics Committee - 18 March 2023, Orlando FL USA



24 February 2024, Long Beach CA USA



Power Magnetics @ High Frequency Workshop

PSMA Magnetics Committee - 24 February 2024, Long Beach, CA USA



PSMA Magnetics Committee Meeting Agenda – Workshop Planning


August 14, 2023

- From Workshop URL: <https://www.pdma.com/technical-forums/magnetics/workshop>

PSMA News Publications Resources Conferences Technical Forums Membership About PSMA
The multinational power electronics association


PSMA / Technical Forums / Magnetics / Workshop


Magnetics Forum

 **Magnetics Info & Resources**
for the Power Electronics Industry.

Introduction HF Task Force Magnetics Checklist Resources Presentations Core Loss Studies Meeting Minutes Workshop

Workshop

**Power Magnetics @ High Frequency Workshop**
PSMA Magnetics Committee - 18 March 2023, Orlando FL USA

**PSMA**
IEEE POWER ELECTRONICS SOCIETY
Powering a Sustainable Future




Registration for the 2024 Power Magnetics @ High Frequency Workshop on Saturday February 24, 2024 at the Long Beach Convention Center in Long Beach, CA will open soon. [Click here](#) to be notified by email when registration opens.

REGISTRATION




► Partnership Opportunities available. [Sign up to be a Workshop Partner](#) Please contact the organizing committee through via e-mail to power@psma.com for more information. [Click here for the pricing and benefits:](#)

2023 Workshop Partners:

Platinum Partners

 **Frenetic**   **WURTH ELEKTRONIK**

Gold Partners

 **CBMM**  **CM**  **HOW2POWER**

Niobium N₂ NEXT-GEN POWER MAGNETICS

Media Partner

**Power Magnetics @ High Frequency Workshop**
PSMA Magnetics Committee - 24 February 2024, Long Beach, CA USA

**PSMA**
IEEE POWER ELECTRONICS SOCIETY
Powering a Sustainable Future

Update once 2024 pool of partners is identified

PSMA Magnetics Committee Meeting Agenda – Workshop Planning

August 14, 2023

- From Tentative Agenda Workbook

Time	Event	Presenter	Affiliation	
7:00 AM - 8:00 AM	Breakfast Plus Technology Demonstrations			
8:00 AM - 8:05AM	Opening Remarks	Ed Herbert	PSMA	
8:05 AM - 8:45 AM	Keynote Speaker Power Magnetics Design - Design and Optimization of Magnetics for Different Applications - Intro	George Slama	Würth Elektronik	
	Multi-objective magnetics design optimization	Scott Sudhoff	Purdue	Invited
	General Techniques to Optimize Magnetics	Johan Kolar	ETH	Invited (Resend)
8:45 AM - 9:20 AM	Technical Session - Design and Optimization of Magnetics for Different Applications			
	Overview of Different Optimization Effort	Jonas Muhlethaler	Frenetic	Confirmed
9:20 AM - 9:40 AM	Q&A		TBD, Muhlethaler	
9:40 AM - 10:00 AM	Break			
	Technical Session - Design and Optimization of Magnetics for Different Applications - Part 2			
10:00 AM - 10:35 AM	Magnetics for VRM Applications	Qiang Li	Virginia Tech - CPES	Accepted
10:35 AM - 11:10 AM	Inductor Optimization Based on Choice of Different Magnetic Materials	Lukas Mueller	Micrometals	Accepted
11:10 AM - 11:45 AM	Optimizing Trade-Offs Between Capacitors and Inductors	David Zawacki	Cornell Dublier	Invited
11:45 AM - 12:00 Noon	Panel Q & A		TBD, Muhlethaler, Li, Mueller, TBD	

	Regroup for next session			
2:00 PM - 2:50 PM	Keynote Speaker Addressing Thermal Design and other special issues as partial discharge, insulation, etc., Intro	George Slama	Würth Elektronik	
	Overview of special issues for the design of magnetics	Charles Sullivan	Dartmouth College	Accepted
	Q & A		Sullivan	
	Technology Session - Thermal Design and other special issues as partial discharge, insulation, etc., - Part 1			
	Opening Remarks	George Slama	Würth Elektronik	
2:50 PM - 3:15 PM	Leading Edge Power Magnetics design - multi -physical, multi-dimensional Optimization Relative to Electrical, Thermal and Commercial Objectives	Roman Jamy	Yageo - Kemet	Accepted
3:15 PM - 3:40 PM	Characterization of Partial Discharges in High-frequency Transformer under PWM Pulses	Zhicheng Guo	Arizona State University	Accepted
3:40 PM - 4:00 PM	Break			
	Technology Session - Thermal Design and other special issues as partial discharge, insulation, etc., - Part 2			
4:00 PM - 4:25 PM	Thermal Issues with Power Magnetics	Subhashish Bhattacharya	NCSU	Accepted
4:25 PM - 4:45 PM	Panel Q & A		Sullivan, Roman, Guo, Bhattacharya	
	Closing Remarks			
4:45 PM - 5:00 PM	Best of the Best	Alex Gerfer	Würth Elektronik	Accepted
	Survey	George Slama	PSMA	Accepted
5:15 PM - 6:30 PM	Networking Hour			

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12:00 Noon - 2:00 PM	Technology Demonstration Session	George Slama	Würth Elektronik	
	Oscilloscope	George Slama	LeCroy, Keysight or Tektronix, Pico	Pending
	Near field measurements useful techniques for electronics engineers	Arturo Mediano	HF Magic Labs	Accepted
	Computer Aided Inductor Optimization	Lukas Mueller	Micrometals	Accepted
	Magnetics for Energy Harvesting Applications	Sergiy Tykhonov	Fraba Ubito	Invited (Responded)
	Partial Discharge	Mathieu LaChance	Omicron Energu	Invited (Resend)
	Power Factor Correction Chokes or Other?	Jim Hodahl	Würth Elektronik	Invited
	Capacitor/Inductor Filter	Frank Puhane	Würth Elektronik	Invited
	High-Q SMD measurements of various components (low ESR and ESL measurements)	Frank Puhane	Zurich Instruments	Invited
	Circuit Simulation of Magnetic Components	Tom Wilson	SIMPLIS Technologies	Accepted
		Aminul Mehedi	CMM	Invited
		Bharadwaj Reddy Andapally	CBMM	Invited (Responded)
		Naomichi Nao Miyari	Hioki	Invited
	Non Linearity of metal alloyed powdered core with micro Pulse 2.0	JC Sun	Bs&T	Accepted
		Dominic Heye	Dexter	Invited
		Mike Araim	Fair Rite	Accepted
		TBD	Miles Platt	Pending
	Emerging Magnetic Materials and Magnetic Structures			
	Posters			
	Regroup for Next Session	-	-	-


PSMA Magnetics Committee Meeting Agenda – Workshop Planning

August 14, 2023

- Other Considerations
 - Lecture Presentations
 - 1. FEA Modelling
 - Technology Demonstrations
 - 1. Dielectric Withstanding Voltage, Partial Discharge – Hipotronics – Matt Weintraub



shop_partnership

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News Publications Resources Conferences Technical Forums Membership About PSMA

Contact Log in Q

2024 Workshop Partnership

Saturday Feb 24, 2024

Long Beach Convention Center, Long Beach, CA

Please complete the information below to sign up as a partner for the Power Magnetics @ High Frequency Workshop.

Platinum Partner
\$2,500

 - Company logo in web page linked to URL of choice
 - Company recognition at entrance
 - Company logo on daily introduction and break slides
 - Company recognition in 'blast e-mail' announcing registration
 - Company logo on social media promotion
 - Register at preferred PSMA rate
 - Company supplied logo can be displayed within workshop
 - Company exhibit table by registration desk only
 - Company may provide branded lanyards for participants (≤150 pcs)

Gold Partner
\$1,500

 - Company logo in web page linked to URL of choice
 - Company recognition at entrance
 - Company logo on daily introduction and break slides
 - Company recognition in 'blast e-mail' announcing registration
 - Company logo on social media promotion
 - Register at preferred PSMA rate

Partnership level*

☐ Platinum Partner

☐ Gold Partner

Name*

Company*

Email*

Phone*

Address*

Address 2

City/Town*

State/Province

ZIP/Postal Code

Country*

- Select -

Number of registrations

All workshop attendees, including anyone who will be staffing your exhibit table, if applicable, need to register for the workshop. As a partner, everyone from your company is eligible to register at the preferred PSMA rate (\$205 early registration/ \$345 regular registration). If you would like to be invoiced for those registrations with your partnership invoice, please indicate the number of registrations below.

☐ I have read and accept the PSMA Privacy Policy*

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Privacy policy

*All partnerships are final. Full payment must be received within 10 business days. Please note that no cancellations or refunds are given once payments are received.

**For any registrations involved with your partnership, there will be a \$25 fee for any cancellations prior to February 7. No refunds will be given after February 7.

If for any reason beyond the workshop organizers' control the workshop must be shortened, delayed, dates changed, or otherwise altered or changed, by submitting your partnership, participant understands and agrees that there will be no refund of the partnership or registration fees paid.

Important notice re COVID-19: By submitting your partnership application, you acknowledge that you will undertake all measures to protect your own health and well-being and those of others in attendance at the workshop, including following all APEC policies in place at the time of the event.

Submit

News	Publications	Resources	Conferences	Technical Forums	Membership	About PSMA
<p>Welcome to the PSMA</p> <p>New Product Announcements</p> <p>Members in the News</p> <p>Other News of Interest</p> <p>Calendar of Events</p> <p>Meeting Schedule</p>	<p>Publications Currently Available from PSMA</p> <p>Non-members Order Form</p> <p>PSMA Publications</p>	<p>Resources Industry Information</p> <p>Industry Links</p> <p>Industry Resources</p> <p>Standards Organizations</p> <p>Standards Updates</p> <p>3D-PSM</p> <p>Industry Resources</p> <p>Job Postings</p> <p>PSMA Awards</p>	<p>Conferences APC</p> <p>CPSS</p> <p>ElectServ</p> <p>ISHP</p> <p>3D-PSM</p> <p>PerSiC</p> <p>WPCA</p>	<p>Technical Forums Capacitor Education</p> <p>Energy Harvesting</p> <p>Energy Management</p> <p>Energy Storage</p> <p>Magnetics</p> <p>Packaging & Manufacturing</p>	<p>Membership Benefits of PSMA Membership</p> <p>Joining Information</p> <p>Application Form</p> <ul style="list-style-type: none"> Members - A - Z Power Supplies Components Service Related 	<p>About PSMA Purpose Mission</p> <p>Industry Leadership Organization</p> <ul style="list-style-type: none"> Association Office Advisory Council Board of Directors Media Information



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PSMA Magnetics Committee Meeting Agenda – Industry Session Planning

August 14, 2023

- Simulation (magnetic & circuit) & modelling
 - Proposal Uploaded to APEC website on Thursday August 10
 - Invitation Sent
 1. Simulation including material data – Minjie Chen Princeton - **ACCEPTED**
 - a) Or High frequency material simulation tools – Minjie Chen Princeton
 2. 2D Vs 3D FEA for magnetics – Scott Berger Ansys
 3. Circuit Simulation Tools – Tom Wilson/Andrija Supas SIMPLS Technologies - **ACCEPTED**
 4. Near Magnetic Fields – Arturo Mediano HF Magic Labs - **ACCEPTED**
 5. Impedance Over Wide Frequency Ranges for Emi Filtering – Fang Luo Stoney Brook University - **ACCEPTED**
 6. Coupling – Bryce Hesterman Utah State University - **ACCEPTED**
 - Other Considerations
 7. Implementing LLC in circuit simulator – ?
 8. Thermal simulation – **Trafo** <https://trafo.eu/>
 9. Winding loss modelling - ?
 10. Magnetic Material modelling – ?
 11. 2D Vs 3D FEA for Magnetics Anderson Hoke formerly of Dartmouth
 12. 2D Vs 3D FEA for Magnetics Jonathan Kimball Missouri University of Science & Technology
 13. Near Magnetic Fields – Matt Wilkowski EnaChip

**5 of 7 slots
confirmed**

Candidates for 7TH Slot

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2022/2023/2024 PSMA PTR Webinar Series

Potential Contributions from the Magnetism Committee

- **Resonant Link – Phyo Aung Kyaw - Complete**
 - **Magnetism based wireless charging**
 - **November 3 2022**
- **Cornell – Khurram Afridi - Complete**
 - **Capacitive based wireless charging**
 - **November 17 2022**
- Tyndall – Ranajit Sai
 - Core Loss Mechanisms
 - Second Half 2023
 - **Connected with Dhaval and Conor**
- Utah State University – Reebal Nimri
 - High Power (1 MW) Charging
 - 2023 Q1/Q2
- Fraunhofer – Torben Dankwort (mems energy harvester) , Thomas Lisec (Powder mems technology)
 - MEMS
 - Fall 2023
 - *Contacted in early August - awaiting responses*

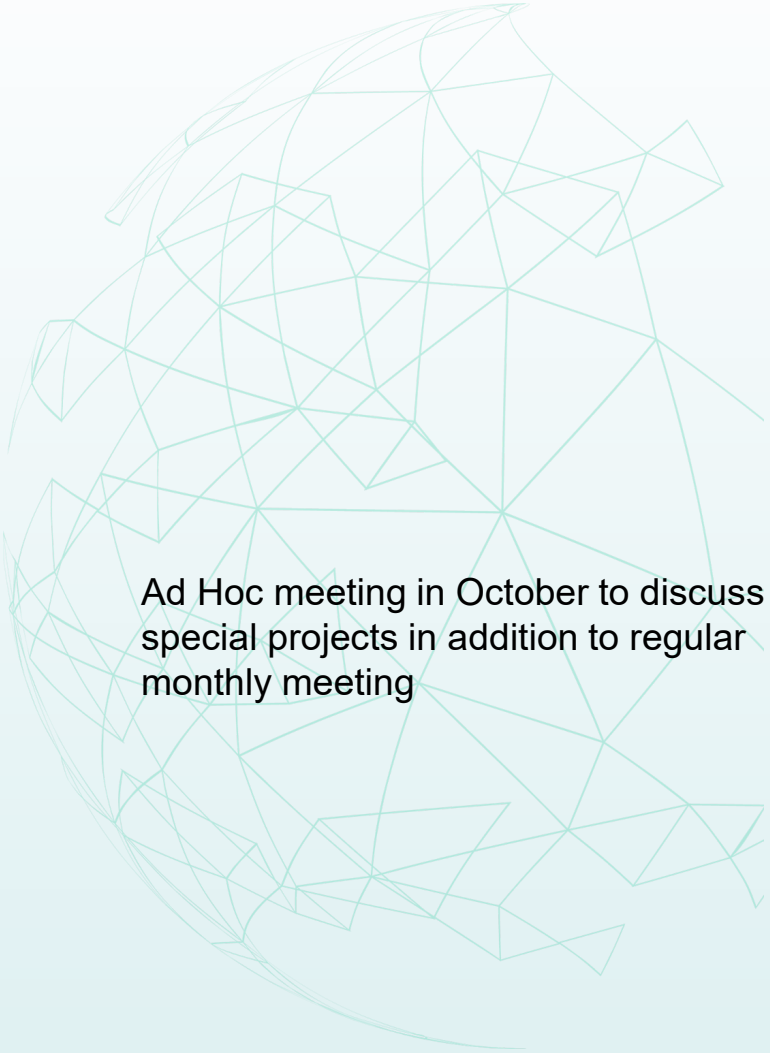


Potential Source of Info Inter Mag
Japan
Presentations
Measurement Techniques
New Materials

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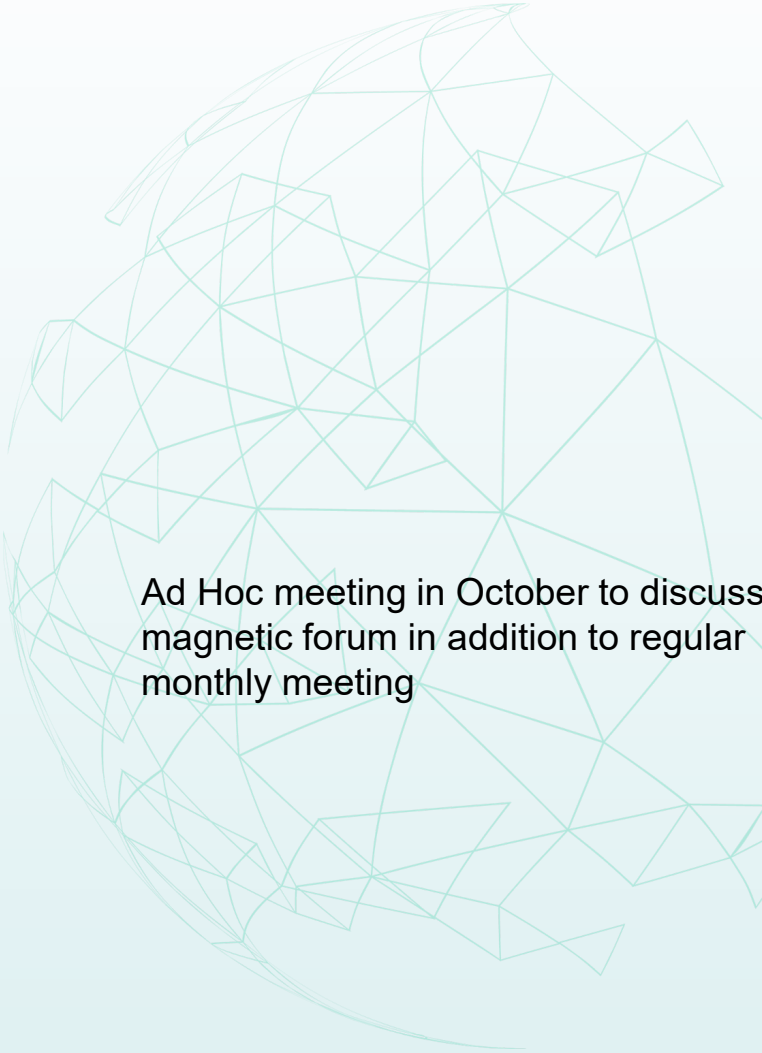


Ad Hoc meeting in October to discuss special projects in addition to regular monthly meeting

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Ad Hoc meeting in October to discuss magnetic forum in addition to regular monthly meeting

PSMA Magnetics Committee Meeting

August 14, 2023

- Attendance (12)
 - John Horzepa
 - Joe Horzepa
 - Mike Arasim
 - Doug Eaton
 - Ed Herbert
 - Bryce Hesterman
 - Lukas Mueller
 - Ranajit Sai
 - George Slama
 - Mark Swihart
 - Rodney Rogers
 - Matt Wilkowski



Thank You

