PSMA Magnetic Committee Minutes
August 30, 2022 @ 10:00 am CDT

Attendees
Matt Wilkowski
George Slama
Ed Herbert
Rodney Rogers
Chuck Wild
Steve Carlsen
Doug Eaton
John Horzepa

Agenda
2023 Industry Session Planning
2023 Workshop Planning
2022 – 2025 PSMA PTR Webinar Series
Magnetics Committee on PSMA Website – not discussed

Discussion
1. Industry session draft dated August 8, 2022 has been upload to APEC website
2. Special project proposal for 2023 power magnetics at high frequency workshop was accepted during PSMA BOD meeting on August 19, 2022
3. Industry session:
    a. Rudy Giesler of National Magnetics and Mark Swihart identified as potential presenters for “measurement waveforms” topic
4. Triad still considering to provide presentation for workshop.
5. Dave LaVasseur (MIntronix), Marian Kazimierczuk (Wright State University) and David Perreault (MIT) identified as potential keynote presenter for workshop.
6. Santosh Kulkarni (Renesas – Dialog) and Patrick Mercier (UCSD) identified as potential presenters for wearable topics for workshop.
7. Add magnetics for energy harvesting to potential list of lecture presentation topics for workshop

Action Items
a. Matt to check with Chuck regarding recruiting Dave Stankes of 3M for a presentation on hard insulation for the workshop.
b. Doug to check with Omicron Energy for a list of names to contact relative to a presentation on partial discharge test equipment for the workshop
c. George to try to obtain list of contacts at Biddle to contact regarding a presentation on partial discharge test equipment
d. George to confirm Dave LaVasseur for keynote presentation for workshop.
e. George to confirm Cem Som and Jim Holdahl as presenters for the workshop
f. Matt to reach out to Brian Zahnstecher and Mike Hayes regarding potential presenter relative to magnetics used in energy harvesting applications.
g. Matt to contact Mike Kavian Ranjram of Arizona State University for potential technology demonstration or student poster for coupled magnetic and electronic systems – noting professor Ranjram previously provided a lecture presentation for coupled electronic and magnetic systems for the 2021 power magnetics at high frequency workshop

Next Meeting
September 19 @ 10:00 am CDT

The Multinational Power Electronics Association

PSMA Magnetics Committee Meeting

August 30TH 2022

George Slama, Matt Wilkowski
Committee Chairs

PSMA Magnetics Committee Meeting Agenda
August 30, 2022

- Introductions
- 2023 Industry Session Planning
  - One pager submitted
  - Updated Ed Herbert draft of August 8, 2022
    - Presentation topics added
- 2023 Workshop Planning
  - Special Projects Submission Form Approved During August PSMA BOD meeting
  - Presenter updates
- Proposals for Magnetics Committee Contributions to Power Technology Roadmap Webinars
- Other Items
  - PSMA Magnetics Committee on PSMA Website

2023 PSMA Magnetics Industry Session

- Updated Industry Session Submission Form

Proposal for an Industry Session for APEC2023

Magnetics Industry Session

"Standardized Core Loss Measurement and Data for Everyone"
(Seven presentations)

Orange County Convention Center
Orlando, Florida
March 20, 21, or 22, 2023

PSMA Magnetics Committee,
August 8, 2022

The PSMA Magnetics Committee proposes a seven topic Industry Session for APEC2023.

The subject is "Standardized Core Loss Measurement and Data for Everyone."

The Industry Session will target the specific interests of the PSMA and APEC audience. For this audience, a common subject of interest is how to obtain meaningful core loss measurements and how to share and exchange data.

The speakers will address a variety of topics related to the measurement of core loss and the presentation of core loss data.

This presentation includes the mechanisms of core loss, measurement of core loss in different materials, measurement at high frequencies, at high and low power, and with non-sinusoidal waveforms. We will discuss the accuracy and resolution of the various methods, We will propose an open-source database for core loss data.

The topics of the seven presentations are as follows:

1. AC Power Loss Mechanisms
2. Practical Core Loss Measurements Across Different Materials
3. Transitioning from Low Frequency (≤ 1 MHz) to High Frequency (≥ 1 MHz) Core Loss Measurements
4. How Core Loss Measurements at High Power (≥ 1 Kilowatt) Differ from Low Power (≤ 1 milliwatt)
5. Core Loss Measurements for Arbitrary Waveforms
6. Baseline Core Loss Measurements Using Calorimetric Methods
7. Validating Quality of and Verification of Core Loss Measurements for Databases

Session Chairmen:
George Slama, George.Slama@we-online.com
Edward Herbert, ed@eh-psma.com

2023 PSMA Magnetics Industry Session

- Theme: Measurement of Core Loss
- Organization
  - Mechanisms of power losses - Confirmed
    - Hasan Baghbaderani - Tyndall
    - Trade-off core design versus coil design
    - Eddy current Vs hysteresis loss Vs anomalous loss
  - Core loss measurements for
    - Powder cores
    - Ferrite cores
    - Amorphous and nanocrystalline cores
  - Low frequency Vs High frequency
    - High frequency (≥ 1 MHz)
  - Power level measurements
    - High power (≥ 1 kilowatt Vs low power ≤ 1 milliwatt)
  - Arbitrary waveforms
    - Generating waveforms
    - Measuring waveforms
  - Baseline Core Loss Measurements using Calorimetric Measurements
  - Validating Quality and Verification of Core Loss Measurements for Databases

Dominic Heye – Dexter Technologies - Confirmed
Practical Core Loss Measurements
Across Different Materials - Confirmed

New slants
Avoid topics that were previously covered
Target audience for core loss measurements
Focus on practical rather than academic
Relationship/influence/interaction of winding/core loss

Potential Candidates for measurement waveforms

Rudy Giesler
rudy@magneticsgroup.com

Mark Swihart

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2023 Power Magnetics at High Frequency Workshop (1 of 2)

- Theme: Magnetic Component Design Across Applications from Milliwatts to Megawatts
- Presenters
  - Keynote Presenter – Candidates
    - TBD (Triad) – Beyond the technical specifications: temperature rise, safety agency and other factors
    - Dave LaVasseur (Minntronix) – Lessons Learned from the Trenches of Practical Product Design
    - Marian Kazimierczuk (Wright State University) – High Frequency Magnetic Components
    - David Perreault (MIT) – Magnetic design across multiple application areas
  - Lecture Presenters
    - Solid State Transformers
      - Kolar, Ohodnicki, Other?
      - Mahmoud Mansour (Utah State University) – Insulation methods for medium voltage transformers
    - Wireless Charging
      - Cem Som (Wurth Elektronik) – Mobile or industrial devices
      - Electric vehicles
    - Transportation Electrification
      - Harold Eicher (Champs Technologies) - 7 kilo-Watt Planar Transformer and Inductor -
    - Wearables
      - Patrick Mercier (UCSD)
      - Renesas (formerly Dialog)
    - IVR
    - Servers
    - IoT
    - Energy Harvesting
      - Reach out to Brian Z/Mike Hayes

2023 Power Magnetics at High Frequency Workshop (2 of 2)

- Theme: Magnetic Component Design Across Applications from Milliwatts to Megawatts
- Presenters
  - Special Topics (afternoon session)
    - Insulation
      - Tim Scott (DuPont) – new polyimide materials
      - Dave Stankes 3M – check with Chuck
    - Corona
    - Encapsulation processes & encapsulation materials
  - Technology Demonstrations
    - Moien Mohamadi – University of Illinois Chicago – Charging Applications
    - Mike Arasim – Fair Rite – Manufacturing Test Equipment (electrical & physical)
    - Arturo Mediano – HF Magic Lab – Near Magnetic Field Measurement Methods
    - Jim Holdahl (Wurth Elektronik) – Power Factor Correction Chokes
    - Test equipment
      - Battery charging – higher voltage – safety equipment – Victor to follow up with potential presenter
      - Hazardous magnetic fields
    - Magnetic materials and structure
    - Coupled Electronic and Magnetic prototypes – Arizona State University

Potential presenters for
Partial Discharge/Corona

Test Equipment manufacturers

Omicron Energy
https://www.omicronenergy.com/en/#

Biddle
https://www.pdix.com/products/partial-discharge-measurement-devices.html

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2023 PSMA PTR Webinar Series
Potential Contributions from the Magnetics Committee

- ETH – Johann Kolar, Jonas Huber
  - Soft-Switched Bridge-Leg Topologies
  - (2L and 3l TCM, ARCP)
- EnaChip – Matt Wilkowski
  - Wafer Level Magnetics
- Tyndall – TBD
  - Wafer Level Magnetics
- Tyndall – Hasan Baghbaderani
  - Core Loss Mechanisms – late 2023 after workshop
- Magnetics for Wireless Charging
  - Reebal Nimri (Utah State University) – High Power (1 MW) Charging – Fall 2023
  - Wurth – low power
- Magnetics for Transportation Electrification
- Physics Based Modelling
- Sustainable Magnetics
- Magnetic Materials
- Insulation Materials
- Core Loss Data Bases
  - More likely a candidate for 2023

Thank You