Fraunhofer

»eHarsh Seminar«
Fraunhofer technology platform for electronics in harsh environments

Nov 29 – Dec 03, 2021 (online)

www.ilt.fraunhofer.de/eharsh-seminar

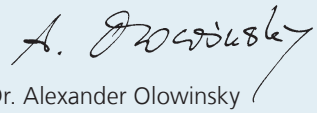
WELCOME

Sensor systems for use in extremely harsh environments

In the online »eHarsh Seminar«, we present the current state of our research and development work in a combination of technical lectures and live demonstrations at eight Fraunhofer locations and offer you interesting insights into our laboratories. From sensor and electronic development to manufacturing technology including simulation and reliability testing, all relevant aspects of building sensors for extremely harsh environments will be covered.

Sensor systems are key elements for the detection of environmental properties and are used in the industrial sector, especially especially in the field of Industry 4.0, for the intelligent control of processes. Under harsh operating conditions such as high temperatures, high mechanical stress or aggressive environments, the use of standard sensors is almost impossible.

We look forward to your participation!



Dr. Alexander Olowinsky

THE TOPICS

Early Bird Registration!

Those booking by September 30, 2021 will be able to take advantage of €100 early bird discount on the conference fee.

The Topics at a Glance

- **Technology platform for sensors in harsh environment**
- **Test, characterization and design of multilayer ceramic sensors**
- **Manufacturing processes for high temperature sensors**
- **Sensors for turbines and engines**
- **Sensors in geothermal applications**

Virtuell Lab Tours

The virtual Lab Tours at the eight Fraunhofer locations offer you a comprehensive insight into our application-oriented research and development work.

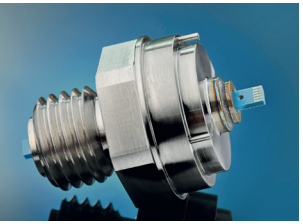
Fraunhofer Lighthouse Project »eHarsh«

The aim of the eHarsh Lighthouse Project is to develop and provide a technology platform on the basis of which sensor systems, comprising sensors and electronics, can be developed and manufactured for use in extremely harsh environments. The realization of such systems requires interdisciplinary skills, starting with the selection of suitable materials and technologies, a range of development expertise, system integration for the required application, and the evaluation and prediction of reliability and operational behaviour. A consortium of eight Fraunhofer Institutes has joined forces under the leadership of the Fraunhofer IMS to bundle these excellent competencies in the Fraunhofer Lighthouse Project »eHarsh«.

Please find more information about the Lighthouse Project at: https://s.fhg.de/vZf

PROGRAM

Monday, November 29, 2021
Session Fraunhofer ILT | Moderation: Holger Kappert



13:00 **Introduction to Fraunhofer Lighthouse Project »Sensor-systems for extreme harsh environments (eHarsh)«**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:30 **Introduction to Fraunhofer ILT**
Dr. Alexander Olowinsky, Fraunhofer ILT, Aachen (D)

13:35 **Use of thermo-mechanical simulations for joining technology and component design**
Dr. Mirko Aden, Fraunhofer ILT, Aachen (D)

14:05 **Glass-to-metal compression seals for the manufacture of helium-tight ceramic multilayer feedthroughs**
Heidrun Kind, Fraunhofer ILT, Aachen (D)

14:35 **Break**

14:45 **Laser based joining of metallic components with dissimilar coefficients of thermal expansion**
Dr. André Häusler, Fraunhofer ILT, Aachen (D)

15:15 **Printed and laser based production of electrical functional layers**
Dr. Christian Vedder, Fraunhofer ILT, Aachen (D)

15:45 **Virtual Lab Tour at Fraunhofer ILT**
Manufacture of laser-based glass feedthroughs and laser beam microwelding of metals

16:15 **End of the lectures**

Tuesday, November 30, 2021
Session Fraunhofer IPM / EMI | Moderation: Holger Kappert

13:00 **Introduction to Fraunhofer Lighthouse Project »Sensorsystems for extreme harsh environments (eHarsh)«**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:10 **Introduction to Fraunhofer IPM**
Martin Jägle, Fraunhofer IPM, Freiburg i. Breisgau (D)

13:15 **Thermal-electrical impedance spectroscopy**
Martin Jägle, Fraunhofer IPM, Freiburg i. Breisgau (D)

13:45 **Setup for high pressure tests at high temperature**
Martin Jägle, Fraunhofer IPM, Freiburg i. Breisgau (D)

14:15 **Break**

14:25 **Introduction to Fraunhofer EMI**
Dr. Sebastian Schopferer, Fraunhofer EMI, Efringen-Kirchen (D)

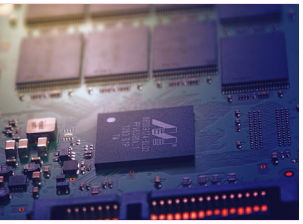
14:30 **Test stand for combined temperature/vibration loads**
Dilara Mert, Fraunhofer EMI, Efringen-Kirchen (D)

15:00 **Dynamic pressure sensor characterization by shock tube tests**
Dr. Sebastian Schopferer, Fraunhofer EMI, Efringen-Kirchen (D)

15:30 **Virtual Lab Tour at Fraunhofer IPM**
Measurements at high temperature and high pressure

16:00 **End of the lectures**

Wednesday, December 1, 2021
Session Fraunhofer IMS / IZM | Moderation: Dr. Alexander Olowinsky



13:00 **Introduction to Fraunhofer Lighthouse Project »Sensor systems for extreme harsh environments (eHarsh)«**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:10 **Introduction to Fraunhofer IMS**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:15 **High temperature CMOS and MEMS technologies**
Dr. Stefan Dreiner, Fraunhofer IMS, Duisburg (D)

13.45 **High temperature integrated sensor electronics**
Dr. Norbert Kordas, Fraunhofer IMS, Duisburg (D)

14:15 **Break**

14:25 **Introduction to Fraunhofer IZM**
Malte Spanier, Fraunhofer IZM, Berlin (D)

14:30 **Embedding technology for SMD components in printed circuit boards**
David Schütze, Fraunhofer IZM, Berlin (D)

15:00 **Assembly and interconnection technology** within the eHarsh project
Malte Spanier, Fraunhofer IZM, Berlin (D)

15:30 **Flip Chip silver sintering**
Olaf Rämer, Fraunhofer IZM, Berlin (D)

16:00 **End of the lectures**

Thursday, December 2, 2021
Session Fraunhofer IKTS | Moderation: Dr. Alexander Olowinsky

13:00 **Introduction to Fraunhofer Lighthouse Project »Sensorsystems for extreme harsh environments (eHarsh)«**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:10 **Introduction to Fraunhofer IKTS**
Dr. Steffen Ziesche, Fraunhofer IKTS, Dresden (D)

13:15 **Thick film and multilayer ceramic technology**
Dr. Steffen Ziesche, Fraunhofer IKTS, Dresden (D)

13:45 **Pressure sensors manufactured in multilayer ceramic technology**
Adrian Goldberg, Fraunhofer IKTS, Dresden (D)

14:15 **Break**

14:45 **Multilayer ceramic-based circuit boards**
Martin Ihle, Fraunhofer IKTS, Dresden (D)

14:55 **Virtual Lab Tour at Fraunhofer IKTS**
Multilayer ceramic manufacturing lab

15:25 **End of the lectures**

Registration

Please use the registration form on the Internet at:
www.ilt.fraunhofer.de/eharsh-seminar

Registration deadline: November 12, 2021

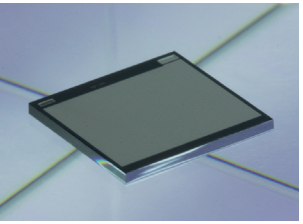
Friday, December 3, 2021
Session Fraunhofer ENAS / IMWS | Moderation: Holger Kappert

13:00 **Introduction to Fraunhofer Lighthouse Project »Sensor systems for extreme harsh environments (eHarsh)«**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

13:10 **Introduction to Fraunhofer IMWS**
Frank Altmann, Fraunhofer IMWS, Halle (D)

13:15 **Characterization and micro structure analyzes on materials and components for harsh environments**
Falk Naumann, Fraunhofer IMWS, Halle (D)

13:40 **Virtual Lab-Tour at Fraunhofer IMWS**
Material characterization and failure diagnostics for high temperature application



14:05 **Break**

14:20 **Introduction to Fraunhofer ENAS**
Dr. Maik Wiemer, Fraunhofer ENAS, Chemnitz (D)

14:25 **CMUT ultrasonic transducer: Development and characterization**
Dr. Nooshin Saeidi, Fraunhofer ENAS, Chemnitz (D)

14:50 **Evaluation of the thermomechanical reliability of electronic systems by means of »virtual prototyping«**
Ralf Döring, Fraunhofer ENAS, Chemnitz (D)

15:15 **Virtual Lab Tour at Fraunhofer ENAS**

15:40 **Outlook**
Holger Kappert, Fraunhofer IMS, Duisburg (D)

15:55 **End of the seminar**

Venue

Virtually via MS Teams

Conference Language

The seminar/presentations will be held online and in English. The moderator will lead through the event in English. Please note: The presentations and the moderation will not be simultaneously translated from English into German.

Participation Fee

The participation fee is €599,- / €499,- (Early Bird Discount until September 30, 2021).

Participation Conditions

You can find the full conditions of participation at:
www.ilt.fraunhofer.de/eharsh-seminar

Programm subject to minor changes.

Contact

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