

Symposium Programme

Programme – Sunday 22 September 2024

14:30-17:00	<p>Social activity (optional)</p> <p>Leipzig guided tour (20 Euro, paid on site)</p> <p>Meeting time: No later than 14:15</p> <p>Meeting point: Mendebrunnen (<i>largest fountain in Leipzig</i>), Augustusplatz 15 (near the symposium venue)</p>
18:00-20:00	<p>Registration (starting from 17:30) and Welcome reception</p> <p>at Cabana Rooftop Terrace Bar in INNSiDE (hotel) Leipzig (Gottschedstraße 1, 04109 Leipzig)</p>
19:30-22:00	<p>Committee dinner and meeting (restricted)</p>

EPCOS 2024

EUROPEAN PHASE-CHANGE AND OVONIC SYMPOSIUM
LEIPZIG, GERMANY, 22 to 25 SEPTEMBER

Programme – Monday 23 September 2024

08:00-09:00 REGISTRATION

09:00-09:15 OPENING REMARKS

SESSION 1 – OTS-SOM (Session chair: Elisa Petroni)

09:15-9:50 **Ovshinsky Award:** Andrea Redaelli – ST Microelectronics, Italy
Phase change memories: a journey to wonderland

09:50-10:15 **Invited speaker** Enrico Varesi – Micron Technology, USA
Single-chalcogenide Xpoint memory (SXM) technology

10:15-10:30 Taras Ravsher – IMEC & KU Leuven, Belgium
Bipolar incremental step read (BISR) scheme for reliable selector-only memory (SOM) operation

10:30-11:05 COFFEE BREAK

SESSION 2 – OTS/SOM – Machine Learning (Session chair: Riccardo Mazzarello)

11:05-11:30 **Invited speaker** Hyunsang Hwang – Pohang University of Science and Technology, South Korea
OTS-based selector-only memory (SOM)

11:30-11:45 Suyoun Lee – Korea Institute of Science and Technology, South Korea
Energy-efficient Ising machine composed of Ovonic threshold switch (OTS)-based nano-oscillators (OTSNOs)

11:45-12:10 **Invited speaker** Ming Xu – Huazhong University of Science and Technology, China
Machine learning uncovers the physics in PCM and OTS chalcogenide glass

12:10-12:25 Yuxing Zhou – University of Oxford, United Kingdom
Device-scale atomistic modelling of phase-change memory materials

12:25-12:40 Nian-Ke Chen – Jilin University, China
Phase-change nature of Ge-Sb-Te superlattice discovered by machine-learning potential molecular dynamics

12:40-12:55 GROUP PHOTO

12:55-15:00 LUNCH BREAK & POSTER PRESENTATIONS

SESSION 3 – Bonding in PCMs (Session chair: Magali Putero)

15:00-15:25 **Invited speaker** Marco Bernasconi – University of Milano-Bicocca, Italy
Unravelling the crystallization kinetics of Ge-rich Ge_xTe alloys and GeTe nanoparticles with a machine-learned interatomic potential

15:25-15:50 **Invited speaker** Oana Cojocaru-Miredin – Albert-Ludwigs-Universität Freiburg, Germany
Atom probe tomography: a local probe for chemical bonds in solids

15:50-16:05 Matthias Wuttig – RWTH Aachen University, Germany
Tailoring chemical bonds to design phase change materials

16:05-16:20 Wei Zhang – Xi'an Jiaotong University, China
Metavalent bonding in layered phase-change memory materials

16:20-16:55 COFFEE BREAK

SESSION 4 – Ab-initio (Session chair: Marco Bernasconi)

16:55-17:10 Franziska Zahn – Leipzig University, Germany
Force constants and bond strength in elemental electron rich Sb

17:10-17:25 Konstantinos Konstantinou – University of Turku, Finland
Nature of electron localization in the recrystallized state of phase-change memory materials

17:25-17:50 **Invited Speaker** Riccardo Mazzarello – Sapienza University of Rome, Italy
First-principles calculations of the fragility of liquid phase change materials

EPCOS 2024

EUROPEAN PHASE-CHANGE AND OVONIC SYMPOSIUM
LEIPZIG, GERMANY, 22 to 25 SEPTEMBER

Programme – Tuesday 24 September 2024

08:30-09:00 REGISTRATION

SESSION 5 – Layered materials and heterostructures (Session chair: Bart Kooi)

- 09:00-09:25 **Invited Speaker Yi Shuang – Tohoku University, Japan**
Boosting phase change memory performance with low melting 2D transition metal telluride
- 09:25-09:40 **Jiangjing Wang – Xi'an Jiaotong University, China**
High-quality synthesis of $Sb_2Te_3/TiTe_2$ thin films
- 09:40-09:55 **Rongjiang Zhu/Hao Tong – Huazhong University of Science and Technology, China**
Low temperature atomic layer deposition of $GeTe/Sb_2Te_3$ superlattice with high-quality structure van der Waals for reliable superlattice structure phase-change memory (SL-PCM)
- 09:55-10:10 **Fabrizio Arciprete – University of Rome Tor Vergata & CNR-IMM, Italy**
Interface formation in phase change heterostructures grown by molecular beam epitaxy
- 10:10-10:25 **Sonja Cremer – Leibniz Institute of Surface Engineering (IOM), Germany**
In situ monitoring of femtosecond laser pulse induced switching of $GeTe-Sb_2Te_3$ multilayers by a streak camera

10:25-11:00 COFFEE BREAK

SESSION 6 – 2D-like structures and GeTe (Session chair: Raffaella Calarco)

- 11:00-11:15 **Yuta Saito – Tohoku University, Japan**
Amorphous crystallization enabling layered chalcogenides for promising electronic device applications
- 11:15-11:40 **Invited Speaker Felix Hoff – RWTH Aachen University, Germany**
Confinement dependent Peierls distortion in epitaxially grown bismuth films
- 11:40-11:55 **Jules Lagrave – University Grenoble Alpes, CEA, LETI, France**
van der Waals growth of thin films of chalcogenide materials for frugal electronics
- 11:55-12:10 **Maxime Culot – Université Grenoble Alpes, CEA, IRIG, SPINTEC, France**
Room temperature spin-charge interconversion in nanodevices made of sputtered GeTe
- 12:10-12:25 **Simon Wintersteller – ETH Zürich, Switzerland**
Unravelling the amorphous structure and crystallization mechanism of GeTe phase change memory materials

12:25-14:30 LUNCH BREAK & POSTER PRESENTATIONS

SESSION 7 – Photonics (Session chair: Pierre Noe)

- 14:30-14:55 **Invited Speaker Sebastian Walfort – University of Muenster, Germany**
The Photoinduced Response of Antimony from Femtoseconds to Minutes
- 14:55-15:10 **Bart Kooi – University of Groningen, Netherlands**
Phase-change thin film generated points of darkness for sensitive reconfigurable optical gas sensor designs
- 15:10-15:35 **Invited Speaker Robert E. Simpson – University of Birmingham, United Kingdom**
Elemental tellurium and interband tunable photonics
- 15:35-15:50 **Anbarasu Manivannan – Indian Institute of Technology Madras, India,**
Development of Ge-rich Ge-Sb-Te-based highly efficient reflective optical modulator

15:50-16:20 COFFEE BREAK

SESSION 8 - Photonics and Nanostructures (Session chair: Robert Simpson)

- 16:20-16:35 **Simon Wredh – Singapore University of Technology and Design, Singapore**
Phase change material tuneable thermoelectric photodetection
- 16:35-17:00 **Invited Speaker Magali Putero – Aix Marseille University, France**
Combining PCM to soft-NIL dielectrics metasurfaces: key advantages, current progress and future
- 17:00-17:25 **Invited Speaker Maksym Yarema – ETH Zürich, Switzerland**
Phase-change memory nanomaterials: status and prospects

19:00-22:00 SYMPOSIUM DINNER at Ratskeller Leipzig (Lotterstraße 1, 04109 Leipzig)

E\PCOS 2024

EUROPEAN PHASE-CHANGE AND OVONIC SYMPOSIUM
LEIPZIG, GERMANY, 22 to 25 SEPTEMBER

Programme – Wednesday 25 September 2022

SESSION 9 – Innovations (Session chair: Yuta Saito)

- 09:00-09:25** **Invited Speaker Ghazi Sarwat Syed – IBM Research Europe, Switzerland**
Disc-type phase change memory devices for low-power and high-density analog in-memory computing
- 09:25-09:40** **Melissa Santala – Oregon State University, USA**
Thermodynamics and kinetics of crystal growth of phase change materials from nanocalorimetry and in situ transmission electron microscopy
- 09:40-09:55** **Mingde Du – University of Oxford, United Kingdom**
Phase change semiconductor heterojunction with switchable rectification ratio
- 09:55-10:10** **Ali Gokirmak – University of Connecticut, USA**
Stopping resistance drift in phase change memory devices

10:10-10:40 **COFFEE BREAK**

SESSION 10 – PCM and Ge-rich GST (Session chair: Andrea Redaelli)

- 10:40-10:55** **Xilin Zhou / Zhitang Song – Shanghai Institute of Microsystem and Information Technology, China**
Three orders of endurance improvement in mushroom type phase change memory (PCM) for storage class memory applications
- 10:55-11:20** **Invited Speaker Sijia Ran – CEMES-CNRS, France**
Linking electrical properties to microstructures and compositions in Ge-rich GeSbTe based phase-change memory cells
- 11:20-11:35** **Jacopo Remondina – Aix Marseille University, France**
Understanding the crystallization of Ge-rich GST alloys in the presence of Nitrogen and Hydrogen dopants
- 11:35-12:00** **Invited Speaker Elisa Petroni – STMicroelectronics, Italy**
A retention study of Ge-GST based ePCM

12:00-12:20 **BREAK**

12:20-12:35 **AWARD CEREMONY & CLOSING**

12:35-13:30 **LUNCH & END**

Poster Presentations – 23 September & 24 September

- | Nr. | Author and Title |
|------|--|
| P-01 | Nur Qalishah Adanan – Singapore University of Technology and Design, Singapore
<i>GeTe-S on Sb₂Te₃: Growth and crystallisation</i> |
| P-02 | George Braid – University of Exeter, United Kingdom
<i>Optical power-handling issues in active phase-change metasurfaces</i> |
| P-03 | Nils Braun – Leibniz Institute of Surface Engineering (IOM), Germany
<i>Investigation of phase transformations in Cu-Sb₂Te₃ systems induced by thermal heating and focused ion beam</i> |
| P-04 | Ming Xu – Huazhong University of Science and Technology, China
<i>Homogeneous photoelectric reservoir computing system based on chalcogenide phase change materials</i> |
| P-05 | Min Gyoo Cho – Seoul National University of Science and Technology, South Korea
<i>Composition controllable plasma-enhanced atomic layer deposition of GeTe_x thin film</i> |
| P-06 | Ye Bin Weon – Seoul National University of Science and Technology, South Korea
<i>Development of atomic layer deposition process of GeSe thin film above 200 °C</i> |
| P-07 | Ju Hwan Park – Seoul National University of Science and Technology, South Korea
<i>Direct observation of operation temperature of ovonic threshold switch using in-situ thermoreflectance imaging</i> |
| P-08 | Inhyuk Choi – Seoul National University, South Korea
<i>Precise measurement of crystallization properties and comparative analysis of crystallization behavior using indirectly heated phase-change memory</i> |
| P-09 | Ruixuan Chu – Xi’an Jiaotong University, China
<i>Atomistic simulations of AgSnSe₂ phase-change material</i> |
| P-10 | Wahyu Diyatmika – Von Ardenne GmbH, Germany
<i>Chemical composition and thickness homogeneity of Ge-Sb-Te-based thin films on an industrial-scale wafer</i> |
| P-11 | Thomas Fernandes – Aix Marseille University & STMicroelectronics, France
<i>Laser-induced crystallization of Ge-rich GST thin films studied in situ with synchrotron X-Ray diffraction</i> |
| P-12 | Siddharth Gautam – IBM Research, Switzerland
<i>Statistical assessment of disc-type phase change memory devices for analog in-memory computing</i> |
| P-13 | Keisuke Hamano – Keio University & National Institute of Advanced Industrial Science and Technology, Japan
<i>The effects of transition metal doping in Ge-Te based selector materials</i> |
| P-14 | Stuart Kendall – University of Exeter, United Kingdom
<i>Active phase-change metasurfaces for convolutional image processing</i> |
| P-15 | Tomi Ketolainen – Tampere University, Finland
<i>Electronic structure and electrical conductivity of Ge₂Sb₂Te₅ heterostructures with different stacking orders</i> |

Poster Presentations – 23 September & 24 September

- Nr. **Author and Title**
- P-16 **Alexander Kiehn – RWTH Aachen University & Forschungszentrum Jülich GmbH, Germany**
Classification of layered chalcogenides: Explaining their mineral diversity in the Earth's crust
- P-17 **Mihyeon Kim – Tohoku University, Japan**
Local structural changes in Cr-Mn-Te polymorphic films
- P-18 **Shih-Yuan Li – Tohoku University, Japan**
The physical properties of MnTe₂ films prepared by RF magnetron sputtering method
- P-19 **Konstantin Shportko/Andriy Lotnyk – Institute of Semiconductor Physics, Ukraine/IOM Leipzig, Germany**
Optical characterization of Ga-Ge-Te alloys within the glassy domain
- P-20 **Pierre Meilleur – University Grenoble Alpes, CEA, LETI & STMicroelectronics, France**
Innovative materials for embedded phase-change memory: from material properties to device performance
- P-21 **Joe Pady – University of Exeter, United Kingdom**
GeSbSeTe phase-change material for write-once and rewritable flexible non-volatile memories
- P-22 **Piotr K. Poppek – University of Groningen, Netherlands**
Towards cryogenic phase change materials for neuromorphic image recognition
- P-23 **Simone Prili – University of Rome Tor Vergata/CNR-IMM, Italy/IBM Europe, Switzerland**
Sputter grown phase change superlattice films: A Systematic characterization
- P-24 **Xueyang Shen – Xi'an Jiaotong University, China**
Atomistic simulations of surface effects on crystallization of amorphous antimony
- P-25 **Lennart Voß – Kiel University, Germany**
Advanced characterization of Sb₂Te₃/GeTe heterostructures using in-situ heating transmission electron microscopy and electron beam induced current in scanning electron microscopy
- P-26 **Xiaozhe Wang – Xi'an Jiaotong University, China**
In-situ TEM study of vacancy disordering in Sb₂Te₃ alloy
- P-27 **Anbarasu Manivannan – Indian Institute of Technology Madras, India**
Impact of eccentricity on the performance of nanotube phase change memory devices
- P-28 **Gyoungsoon Oh – Sungkyunkwan University/ Ewha Womans University, Republic of Korea**
Investigation of switching behavior in Ge₂Sb₂Te₅ cells under DC voltage sweeping
- P29 **Junchao Song – University of Exeter, United Kingdom**
Optimising the readout process in integrated phase-change photonic memory and computing devices
- P-30 **Gilles Silly – University Montpellier, CNRS, ENSCM, France**
Exploration of the impact of Ge vacancies in the Ge-Te binary via ¹²⁵Te NMR and DFT