E\PCOS 2024

EUROPEAN PHASE-CHANGE AND OVONIC SYMPOSIUM

LEIPZIG, GERMANY, 22 to 25 SEPTEMBER

Programme – Sunday 22 September 2024

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

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Programme – Monday 23 September 2024

08:00-09:00	**REGISTRATION**
09:00-09:15	**OPENING REMARKS**
	SESSION 1 – OTS-SOM
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
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
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
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*

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Programme – Tuesday 24 September 2024

08:30-09:00 **REGISTRATION**

SESSION 5 – Layered materials and heterostructures

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

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

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

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)**

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Programme – Wednesday 25 September 2022

SESSION 9 – Innovations

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

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**

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Poster Presentations – 23 September & 24 September

Nr. **Author** and *Title*

P-01 **Nur Qalishah Adanan – Singapore University of Technology and Design, Singapore**
GeTe-S on Sb_2Te_3: Growth and cystallisation

P-02 **George Braid – University of Exeter, United Kingdom**
Optical power-handling issues in active phase-change metasurfaces

P-03 **Nils Braun – Leibniz Institute of Surface Engineering (IOM), Germany**
Investigation of phase transformations in Cu-Sb_2Te_3 systems induced by thermal heating and focused ion beam

P-04 **Ming Xu – Huazhong University of Science and Technology, China**
Homogeneous photoelectric reservoir computing system based on chalcogenide phase change materials

P-05 **Min Gyoo Cho – Seoul National University of Science and Technology, South Korea**
Composition controllable plasma-enhanced atomic layer deposition of $GeTe_x$ thin film

P-06 **Ye Bin Weon – Seoul National University of Science and Technology, South Korea**
Development of atomic layer deposition process of GeSe thin film above 200 ℃

P-07 **Ju Hwan Park – Seoul National University of Science and Technology, South Korea**
Direct observation of operation temperature of ovonic threshold switch using in-situ thermoreflectance imaging

P-08 **Inhyuk Choi – Seoul National University, South Korea**
Precise measurement of crystallization properties and comparative analysis of crystallization behavior using indirectly heated phase-change memory

P-09 **Ruixuan Chu – Xi'an Jiaotong University, China**
Atomistic simulations of $AgSnSe_2$ phase-change material

P-10 **Wahyu Diyatmika – Von Ardenne GmbH, Germany**
Chemical composition and thickness homogeneity of Ge-Sb-Te-based thin films on an industrial-scale wafer

P-11 **Thomas Fernandes – Aix Marseille University & STMicroelectronics, France**
Laser-induced crystallization of Ge-rich GST thin films studied in situ with synchrotron X-Ray diffraction

P-12 **Siddharth Gautam – IBM Research, Switzerland**
Statistical assessment of disc-type phase change memory devices for analog in-memory computing

P-13 **Keisuke Hamano – Keio University & National Institute of Advanced Industrial Science and Technology, Japan**
The effects of transition metal doping in Ge-Te based selector materials

P-14 **Stuart Kendall – University of Exeter, United Kingdom**
Active phase-change metasurfaces for convolutional image processing

P-15 **Tomi Ketolainen – Tampere University, Finland**
Electronic structure and electrical conductivity of $Ge_2Sb_2Te_5$ heterostructures with different stacking orders

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 $MnTe_2$ 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. Popek – 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 Sb_2Te_3/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 Sb_2Te_3 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 **Gyounghoon Oh – Sungkyunkwan University/ Ewha Womans University, Republic of Korea**
Investigation of switching behavior in $Ge_2Sb_2Te_5$ 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 ^{125}Te NMR and DFT