

Photonische Netze

24th VDE ITG conference

May 9th – 10th, 2023

Hochschule für Technik, Wirtschaft und
Kultur Leipzig (HTWK)

www.vde.com/photonik-2023

24th VDE ITG conference „Photonische Netze“

The VDE-ITG-Fachausschuss KT 3 “Optische Nachrichtentechnik” and VDE ITG Fachgruppe KT 3.3 “Photonische Netze” organise the 24th VDE ITG conference „Photonische Netze“ on May 9th – 10th, 2023.

Conference chair

Prof. Dr.-Ing. Christian-Alexander Bunge
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Organization

Dr.-Ing. Volker Schanz
Informationstechnische Gesellschaft im VDE (ITG)
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Technical committee members:

- Prof. Dr.-Ing. Thomas Bauschert, TU Chemnitz
- Dipl.-Ing. Matthias Berger, II-VI
- Dr.-Ing. Dirk Breuer, Deutsche Telekom AG
- Prof. Dr.-Ing. Christian-Alexander Bunge, HTWK Leipzig
- Dr.-Ing. Jörg-Peter Elbers, ADVA Optical Networking SE
- Dr. Chris Fludger, Infinera
- Prof. Dr.-Ing. Ronald Freund, Technische Universität Berlin, Fraunhofer-Institut f. Nachrichtentechnik, Heinrich-Hertz-Institut
- Prof. Dr. Anna Lena Giesecke, Universität Duisburg-Essen
- Dr. Dirk Giggenbach, Deutsches Zentr. f. Luft- u. Raumfahrt e.V.
- Dr.-Ing. Andreas Gladisch, Deutsche Telekom AG
- Dr. Gernot Göger, HUAWEI Technologies Düsseldorf GmbH
- Prof. Dr.-Ing. Hans-Joachim Grallert
- Dr.-Ing. Helmut Grießer, Adva Network Security GmbH
- Prof. Dr.-Ing. Norbert Hanik, Technische Universität München
- Prof. Dr. Admela Jukan, TU Carolo-Wilhelmina zu Braunschweig
- Prof. Dr. Volker Jungnickel, Fraunhofer-Institut f. Nachrichtentechnik, Heinrich-Hertz-Institut
- Prof. Dr.-Ing. Andreas Kirstädter, Universität Stuttgart
- Prof. Dr. Christian Koos, Karlsruher Institut für Technologie
- Prof. Dr.-Ing. Peter Krummrich, TU Dortmund
- Dr.-Ing. Andreas Leven, Nokia Solutions and Networks GmbH & Co. KG
- Dipl.-Ing. Christian Neumeyr, VERTILAS GmbH
- Prof. Dr.-Ing. Reinhold Noé, Universität Paderborn
- Prof. Dr.-Ing. Stephan Pachnicke, Christian-Albrechts-Universität zu Kiel
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- Dr.-Ing. Christoph Schullien, Ranovus GmbH
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- Prof. Dr.-Ing. Andreas Stöhr, Universität Duisburg-Essen
- Dipl.-Phys. Andreas Umbach, AUCCEPT Consulting GmbH
- Dr.-Ing. Dirk van den Borne, Juniper Networks
- Dr. Thomas Weidlich, s&p Beratungs- und Planungsgesellschaft mbH
- Prof. Dr.-Ing. Jeremy Witzens, RWTH Aachen University
- Prof. Dr.-Ing. Lars Zimmermann, IHP GmbH

10:00 **Opening**
Christian-Alexander Bunge

Session: Space-Division Multiplexing

10:00 Invited talk
State of the art of space-division multiplexing transmission systems
Georg Rademacher (Universität Stuttgart)

10:30 **Space-Division Multiplexing for the Fiber-Optic Networking Infrastructure of Datacenters**
Jonas Krimmer, Simon Stöhr, Philipp-Immanuel Dietrich, Stefan Schmidt, Hermann Kapim, Alexandra Henniger-Ludwig, Sebastian Randel (Institute of Photonics and Quantum Electronics (IPQ), Karlsruhe Institute of Technology (KIT), Karlsruhe)

10:45 **Industrial scaled MCF – Design, Fabrication and Characterization**
Tobias Tieß, Michael Lorenz, Felix Marschall, Kay Schuster, Kai Habel, Christoph Kottke, Sarah Cwalina (Heraeus Comvance, Heraeus Quarzglas Bitterfeld GmbH & Co KG, Bitterfeld-Wolfen)

11:00 **Modeling weakly coupled homogeneous multicore fibers within an SDM simulation environment**
Igor Koltchanov, Alexander Uvarov, André Richter (VPIphotonics GmbH, Berlin)

- 11:15 **Experimental and Numerical Evaluation of CAZAC-type Training Sequences for MxM SDM-MIMO Channel Estimation**
Nicolas Braig-Christophersen, Andreas Maaßen, Juan L. Moreno Morrone, Carsten Schmidt-Langhorst, Robert Elschner, Johannes Fischer, Colja Schubert (Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institute Berlin)
- 11:30 **Contribution of Forward Rayleigh Scattering to Mode Coupling in Multi Mode Fibers used for Space Division Multiplexing**
Christian M. Spenner, Klaus Petermann, Peter M. Krummrich (Lehrstuhl für Hochfrequenztechnik, Technische Universität Dortmund)
- 11:45 **Intercore-gain-crosstalk in multicore fiber amplifiers for telecommunication applications**
Benedikt Beck, Benjamin Yildiz, Lutz Rapp, Bernhard Schmauss, Till Walbaum (Institute of Microwaves and Photonics, Friedrich-Alexander-University Erlangen-Nürnberg)
- 12:00 **Lunch break**

Session: Networks

- 13:00 Invited talk
Products innovations in the access network: Building the network for 2030
Sander Jansen (ADVA Optical Networking SE, Meiningen)
- 13:30 **Grooming Connectivity Intents in IP-Optical Networks Using Directed Acyclic Graphs**
Filippos Christou, Andreas Kristädte (Institute of Communication Networks and Computer Engineering (IKR) University of Stuttgart)
- 13:45 **OpenROADM in Disaggregated Optical Transport Network: Challenges, Requirements, and Empirical Analysis**
Vignesh Karunakaran, Sai Kireet Patri, Stefan Zimmermann, Achim Autenrieth, Thomas Bauschert (ADVA Optical Networking SE, München)
- 14:00 **Analytical Approach to Account for ISRS when Planning Ultra-Wide Band DWDM Optical Networks**
Dmitry Khomchenko, André Richter (VPIphotonics GmbH, Berlin)
- 14:15 **A Novel Heuristic for Resilient T-SDN Control-Plane Design in Optical Transport Networks**
Shabnam Sultana, Ronald Romero Reyes, Khai Tuan Nguyen, Thomas Bauschert (Chair for Communication Networks, Technische Universität Chemnitz)

- 14:30 **Planning Low-Cost SDN Transport Networks with Integrated, Fast and Robust IP-Optical Restoration**
Ronald Romero Reyes, Thomas Bauschert
(Chair for Communication Networks,
Technische Universität Chemnitz)
- 14:45 **Multi-connectivity in 6G mobile networks by space division multiplexing in combination with radio over fiber**
Peter. M. Krummrich, Majdi. F. A. Hammouri,
(Lehrstuhl für Hochfrequenztechnik,
Technische Universität Dortmund)
- 15:00 **Coffee break**

Session: Data Transmission

- 15:20 **Performance Comparison of Efficient Fiber Kerr Nonlinearity Mitigation Schemes in a Dispersion-Managed Link for 32-GBd 16-QAM Signal**
Vegenshanti Dsilva, Juan L. Moreno Morrone,
Isaac Sackey, Gregor Ronniger,
Guillermo von Hünefeld, Johannes Karl
Fischer, Colja Schubert, Ronald Freund
(Fraunhofer Institute for Telecommunications,
Heinrich-Hertz-Institute, Berlin)
- 15:35 **Phase-Predistortion to Mitigate Chromatic Dispersion Effects in Direct Detection Systems**
Ulrike Höfler, Norbert Hanik (Technical
University of Munich)

15:50 **Learning to exploit z-Spatial Diversity for Coherent Nonlinear Optical Fiber Communication**
Sebastian Jung, Tim Uhlemann, Alexander Span, Maximilian Bauhofer, Stephan ten Brink (Institute of Telecommunications, University of Stuttgart)

16:05 **Noise Figure and Homodyne Noise Figure**
Reinhold Noe (Paderborn University, EIM-E, Paderborn)

16:20 **Panel discussion: Energy efficiency vs resilience?**
Participants from industry

17:00 **End of technical sessions**

19:30 **Conference dinner at the Ratskeller Leipzig**

**Session: Components and
Quantum-Key Distribution**

- 09:00 Invited talk
Acoustic Sensing with Correlation and Coherent Detection using an Integrated Coherent Transceiver
André Sandmann, Florian Azendorf, Saif Alnairat, Michael Eiselt, (ADVA Optical Networking SE, Meiningen)
- 09:30 **Wavelength-Selective Switch for Space-Division Multiplex Systems**
Lutz Rapp, Steffen Trautmann, Jean-Christophe Olaya, Florian Spinty, Philip Engel, David Kirchner, Michael Eiselt (ADVA Optical Networking SE, Meiningen)
- 09:45 **Modelling spectral hole burning of EDFA assuming a small number of distinct groups of erbium ions**
Inga L. Rittner, Peter M. Krummrich (Chair for High Frequency Technology, Technische Universität Dortmund)
- 10:00 **Ultra-compact Forward-biased Silicon Modulators**
Sourav Dev, Karanveer Singh, Mircea Catuneanu, Hrishikesh Vithalani, Arezoo Zarif, Mohamed I. Hosni, Thomas Schneider, Kambiz Jamshidi (Integrated Photonic Devices Group, Technische Universität Dresden)
- 10:15 **Do Propagating Semiclassical Light-waves Contain Photons?**
Reinhold Noe (Paderborn University, EIM-E, Paderborn)

- 10:30 **Optimized Deployment and Routing Strategies for QKD and DWDM Networks**
Mario Wenning, Sai Kireet Patri, Tobias Fehenberger, Carmen Mas-Machuca (ADVA, Martinsried/München)
- 10:45 **Adapted Routing in QKD Networks for Improved Resource Utilization**
Daniel Giemsa, Matthias Gunkel, Tim Johann, Robin Böhm, Falk Reuter (Deutsche Telekom Technik GmbH, Darmstadt)
- 11:00 **Routing Optimization of QKD-Networks using Machine-Learning Based Prediction**
Tim Johann, Daniel Giemsa, Stephan Pachnicke (Chair of Communications, Kiel University)
- 11:20 **Coffee break**

Session: FreeSpace Optics and
Satellite Communication

- 11:40 **Real-Time 10 Gbit/s Digital Combining Over a 3 km Free-Space Optical Link With Multi-Aperture Receiver**
Peter Hanne, Aymeric Arnould, Nicolas Perlot, Abraham Johst, Bill Antonio Bernhardt, Marcel Rothe, Ronald Freund (Fraunhofer Institute for Telecommunications, Heinrich-Hertz Institute, Berlin)

- 11:55 **Optical communication terminals for small satellites between research and market application**
Christopher Schmidt, Benjamin Rödiger, Christian Fuchs (German Aerospace Center (DLR), Institute of Communications and Navigation, Wessling)
- 12:10 **Modeling of Scintillation and Phase Fluctuations and Investigating the Effects in MIMO Systems**
Hung Le Son, Robert T. Schwarz, Marcus T. Knopp, Dirk Giggenbach, Andreas Knopp (Institute of Information Technology, University of the Bundeswehr Munich, Neubiberg)
- 12:25 **The Optical Ground Station in Neubiberg for Free-Space Optical Research and Experimentation**
Robert T. Schwarz, Hung Le Son, Marcus T. Knopp, Andreas Köhler, Andreas Knopp (Institute of Information Technology, University of the Bundeswehr Munich, Neubiberg)
- 12:40 **Performance Comparison of Timing Recovery Algorithms for Optical Ground to Satellite Links**
Carl Valjus, Raphael Wolf (Institute of Communications and Navigation German Aerospace Center (DLR), Oberpfaffenhofen)
- 12:55 **Closing**

General remarks

Conference venue

Hochschule für Technik, Wirtschaft und Kultur Leipzig
Zschochersche Straße 69
04229 Leipzig

How to get there:

<https://www.htwk-leipzig.de/hochschule/standorte-lageplan>

Housing

Please consult Leipzig's official website:

<https://www.leipzig.de/freizeit-kultur-und-tourismus/tourismus>

Conference dinner

Joint dinner on May 9th, 2023, at 19:30h:

Ratskeller der Stadt Leipzig GmbH

Lotterstraße 1
04109 Leipzig
Phone: 0341 123 45 67
www.ratskeller-leipzig.de

Registration

Potential participants are friendly asked to register by

April 13th, 2023. Use the following link:

www.vde.com/photonik-2023

For registrations **later than April 13th, 2023** a supplementary fee will be charged.

On-site registration will also be possible.

The registration is performed and organised by VDE Konferenz-Service. For any questions please refer to:

VDE Konferenz-Service
Merianstraße 28, 63069 Offenbach
Phone: 069 6308 275, Fax: 069 6308 144
E-Mail: vde-conferences@vde.com

Registration fee and proceedings

Registration includes complimentary coffee, lunch and conference dinner on May 9th. A link to the electronic proceedings will be sent in advance.

Additional proceedings can be purchased via:

Phone: 030 34 80 01 - 224

E-Mail: buchverlag@vde-verlag.de

www.vde-verlag.de/buecher.html

Conference fees

	Early bird until 04/12/2023	Regular price from 04/13/2023
Regular	€ 340,00	€ 400,00
Personal VDE members*	€ 290,00	€ 350,00
Presenters/HTWK personell	€ 290,00	€ 350,00
Students* ** *** Non VDE member (w/o proceedings, conference dinner and refreshments)	€ 50,00	€ 100,00
Students with VDE membership* ** (w/o proceedings, conference dinner and refreshments)	free	free
only conference dinner for accompanying person	€ 65,00	€ 65,00

* Reduction only possible after sending a copy of the membership card or student ID.

** only applicable for Bachelor's or Master's students, no PhD candidates.

*** Free registration when VDE membership will be started immediately.

Payment procedure

Please transfer the fee to the given account after you received the invoice. Indicate the participant's name and the invoice number on the bank transfer. You can also pay by credit card. Then indicate your credit-card information on the registration form.

Please note: The online reservation is only valid after successful money transfer.

Cancellation

For cancellations until April 12th, 2023 the conference fee will be refunded except for 30,00 EUR administrative costs. Cancellations after April 12th, 2023 cannot be refunded at all. The proceedings will be sent via post after the conference.

Overview map



