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Advance Programme

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- European Physical Society / Quantum Electronics and Optics Division
- IEEE Photonics Society
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WORLD OF PHOTONICS CONGRESS

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ROOM 14b ICM

WEB-1.5 WED 15:00
Suppression via Atomic Absorption in a Raman Quantum Memory
 M. Hird^{1,2}, S.E. Thomas^{1,3}, J.D. Murns^{1,3}, B. Brecht^{1,4}, J. Saunders¹, J. Nunn^{1,5}, I.A. Jaksley^{1,3}, and P.M. Ledingham¹, University of Oxford, Oxford, UK; ²Imperial College London, UK; ³Imperial College London, London, UK; ⁴Paderborn University, Paderborn, Germany; ⁵University of Bath, Bath, UK
 We propose and demonstrate a scheme to strongly suppress four-wave mixing noise on the output of a Raman quantum optical memory. We show that heralded single-photon states can be recalled non-destructively using our device.

WEB-1.6 WED 15:15
Towards storage of sub-megahertz single photons in Gradient Echo Memory
 Y.S. Lau¹, A.C. Leung², Y. Paul², A.D. Franter², G.T. Campbell², T.J. Weinhold¹, P.K. Lam¹, A.G. White¹, and B.C. Barber²; ¹ARC Centre of Excellence for Engineered Quantum Systems, School of Mathematics and Physics, University of Queensland, Brisbane, Australia; ²ARC Centre of Excellence for Computation and Communication Technology, Department of Quantum Science, The Australian National University, Canberra, Australia
 We report on the integration of sub-megahertz single photons storage with the Gradient Echo Memory protocol using ⁸⁷Rb ions. Technical challenges, initial results and future directions will be discussed.

ROOM Osterseen ICM

EJ-2.4 WED 15:00
Completely Positive Trace Preserving Numerical Methods for Long-Term Generalized Maxwell-Bloch Simulations
 M. Riesch and C. Jirauschek, Technical University of Munich, Munich, Germany
 We evaluate numerical methods for the generalized Maxwell-Bloch equations with respect to performance. Here, we focus on completely positive trace preserving methods that are suitable for long-term simulations of the quantum cascade laser dynamics.

EJ-2.5 WED 15:15
Inverse photonic design of functional elements that focus Bloch surface waves
 Y. Augenstein¹, A. Vetter^{2,3}, B.V. Lahijani⁴, H.P. Herzig⁴, M.-S. Kim⁴, and C. Rockstuhl^{1,2,3}; ¹Institute of Theoretical Solid State Physics, Karlsruhe Institute of Technology, Karlsruhe, Germany; ²Institute of Nanotechnology, Karlsruhe Institute of Technology, Karlsruhe, Germany; ³SUSS MicroOptics SA, Hauterive, Switzerland; ⁴Optics & Photonics Technology Laboratory, Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
 We present a computational strategy to design functional elements that focus Bloch surface waves. Sub-wavelength focusing is predicted while exploiting near-field effects. Optimised structures are fabricated and their functionality is experimentally proven.

ROOM 1 Hall A1

ED-5.5 WED 15:00
Coherent control of quantum cascade laser frequency combs via electrical injection locking
 J. Hillbrand¹, A.M. Andrews², H. Detz³, G. Strasser¹, and B. Schwarz¹; ¹Institute of Solid State Electronics, TU Wien, Vienna, Austria; ²Center for Micro- and Nanostructures, TU Wien, Vienna, Austria; ³CEITEC, Brno University of Technology, Brno, Czech Republic
 Coherent electrical injection-locking allows to reference the repetition frequency of quantum cascade laser frequency combs to an external RF oscillator. We investigate the dynamics of the injection-locked QCL comb and demonstrate its applications in dual-comb spectroscopy.

ED-5.6 WED 15:15
Frequency noise and phase-locking of a quantum cascade laser-pumped, 1.073 terahertz molecular laser using a 1560nm frequency comb
 S. Barbieri¹, J.-F. Lampin¹, G. Santarelli², A. Pagès¹, S. Eliet¹, J. Hesler³, W. Hansel⁴, and R. Holzwarth⁴; ¹Laboratoire IEMN, CNRS, Université de Lille, Villeneuve d'Ascq, France; ²Institut d'Optique Graduate School, CNRS, Université de Bordeaux, Talence, France; ³Virginia Diodes Inc., Charlottesville, USA; ⁴Merlo Systems GmbH, Martinsried, Germany
 We report the measurement of the frequency noise power spectral density of a quantum cascade laser-pumped 1.073THz molecular laser and demonstrate its phase-locking to the harmonic of the repetition rate of a 1560nm frequency comb

ROOM 2 Hall A1

CG-5.5 WED 15:00
Time-Resolved Photoelectron and Photoion Imaging of Molecular Dynamics Using Low-Order Harmonic Generation
 V. Svoboda¹, C. Wang^{1,2}, M.A. Silva-Tolado¹, and H.J. Würner¹; ¹Laboratory of Physical Chemistry, ETH Zurich, Zurich, Switzerland; ²Institute of Atomic and Molecular Physics, Jilin University, Changchun, China
 Using femtosecond deep VUV pump UV probe scheme to reveal the different time scale of Rydberg state dynamics and population redistribution between them for ammonia, and also the ultrafast dissociative ionization dynamics from SF6+.

CG-5.6 WED 15:15
Probing molecular influence on photoemission delays
 S. Biswas^{1,2}, B. Förg^{1,2}, J. Schöiz^{1,2}, W. Schweinberger^{1,3}, L. Ortmann⁴, T. Zimmermann⁵, L.-W. Pi⁴, D. Baykushva⁶, H. Masood³, I. Liotos³, A. Kamal³, N. Kling¹, A. Alharbi⁷, M. Alharbi³, A. Azzeer³, H.-J. Würner⁶, A. Landsman⁴, and M. Kling^{1,2}; ¹Physics Department, Ludwig Maximilians Universität, Munich, Germany; ²Max Planck Institute for Quantum Optics, Munich, Germany; ³Attosecond Science Laboratory, Physics and Astronomy Department, King Saud University, Riyadh, Saudi Arabia; ⁴Max Planck Institute for the Physics of Complex Systems, Dresden, Germany; ⁵Department of Mathematics, ETH Zurich, Zurich, Switzerland; ⁶Laboratory of Physical Chemistry, ETH Zurich, Zurich, Switzerland; ⁷King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia
 Molecular photoemission delay includes contributions from electron birth process and its subsequent propagation within the molecular

ROOM 3 Hall A1

CE-9.5 WED 15:00
Rare-earth activated polymer composite fibers - technology and characterization
 R. Piramidowicz¹, A. Jusza¹, K. Anders¹, L. Lipińska², and P. Mergo³; ¹Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, Warsaw, Poland; ²Institute of Electronic Materials Technology, Warsaw, Poland; ³Faculty of Chemistry, Maria Curie-Skłodowska University, Lublin, Poland
 In this work, we present the results of research on PMMA-based composites and first polymer composite fibers activated with rare-earth ions, discussing main technological problems and challenges as well as the results achieved so far.

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