



[Add To My Schedule](#) **Towards electrically pumped topological insulator lasers (Conference Presentation)**

Paper 11301-37

Time: 11:20 AM - 11:40 AM


Author(s): Jaehyuck Choi, William Hayenga, Midya Parto, Yuzhou Liu, Demetrios Christodoulides, Mercedesh Khajavikhan, Univ. of Central Florida (United States)

[Add To My Schedule](#) **Frequency-agile metasurface quantum-cascade lasers (Conference Presentation) (Invited Paper)**

Paper 11301-38

Time: 11:40 AM - 12:10 PM

Author(s): Christopher A. Curwen, Univ. of California, Los Angeles (United States); John L. Reno, Sandia National Labs. (United States); Benjamin S. Williams, Univ. of California, Los Angeles (United States)

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Lunch/Exhibition Break 12:10 PM - 1:40 PM

**Session 9:
QCL Frequency Combs and Mode Locking**

Wednesday 5 February 2020

1:40 PM - 3:20 PM

Location: Room 306 (Level 3 South)

Session Chair: Giacomo Scalari, ETH Zurich (Switzerland)

Ultrafast gain dynamics in quantum cascade lasers: new coherent phenomena and their applications (Conference Presentation) (Keynote Presentation)

Paper 11301-39

Time: 1:40 PM - 2:20 PM


Author(s): Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (United States)

[Add To My Schedule](#) **Frequency-comb generation in ring-injection lasers by defect engineering (Invited Paper)**

Paper 11301-40

Time: 2:20 PM - 2:50 PM


Author(s): Marco Piccardo, Harvard Univ. (United States); Benedikt Schwarz, Maximilian Beiser, Technische Univ. Wien (Austria); Dmitry Kazakov, Harvard Univ. (United States); Yongrui Wang, Texas A&M Univ. (United States); Michele Tamagnone, Wei Ting Chen, Alexander Y. Zhu, Harvard Univ. (United States); Alexey Belyanin, Texas A&M Univ. (United States); Federico Capasso, Harvard Univ. (United States)

[Add To My Schedule](#) **Understanding frequency-modulated combs (Conference Presentation) (Invited Paper)**

Paper 11301-41

Time: 2:50 PM - 3:20 PM

Author(s): Benedikt Schwarz, Nikola Opacak, Technische Univ. Wien (Austria)

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Most comb research is focused on the generation of pulses. However, frequency combs can also exhibit a very different behavior that is characterized by a continuous output intensity – the frequency modulated (FM) comb regime. Here, we present our theory including a new master equation to describe the involved physical mechanisms and explain which conditions need to be fulfilled to generate self-starting FM combs. Using our new insights we will discuss experimental observations of FM combs in quantum cascade lasers, as well as lasers with slower dynamics, such as interband cascade, quantum well and quantum dot laser.

Coffee Break 3:20 PM - 3:50 PM

**Session 10:
QCL Frequency Combs, Mode Locking, and Spectroscopy Applications**

Wednesday 5 February 2020

3:50 PM - 5:50 PM


Location: Room 306 (Level 3 South)

Session Chair: [Marco Piccardo](#), Harvard Univ. (United States)**Broadband THz and mid-IR quantum-cascade-laser frequency combs (Conference Presentation) (Invited Paper)**

Paper 11301-42

Time: 3:50 PM - 4:20 PM

Author(s): Giacomo Scalari, Andres Forrer, Matthew Singleton, David Stark, Filippos Kapsalidis, Mattias Beck, Jerome Faist, ETH Zurich (Switzerland)

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Photonics West Exhibition: 4-6 February 2020

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CONFERENCE 11301

WEDNESDAY 5 FEBRUARY

SESSION 7

LOCATION: ROOM 306 (LEVEL 3 SOUTH) WED 8:10 AM TO 10:00 AM

Photonic Bandgap and Microcavity

Session Chair: **Luke J. Mawst**, Univ. of Wisconsin-Madison (USA)

8:10 am: **Analysis by a simple coupled-bloch-mode approach of various PhC laser cavities**, Marco Saldutti, Politecnico di Torino (Italy); Jesper Mørk, Technical Univ. of Denmark (Denmark); Mariangela Gioannini, Politecnico di Torino (Italy) [11301-30]

8:30 am: **Properties of laterally coupled photonic crystal surface-emitting laser two-dimensional arrays**, Aleksandr Boldin, Daehyun Kim, Richard J. E. Taylor, Ben King, Univ. of Glasgow (United Kingdom); Adam McKenzie, Compound Semiconductor Technologies Global Ltd. (United Kingdom) and Univ. of Glasgow (United Kingdom); Nasser Babazadeh, The Univ. of Sheffield (United Kingdom); Pavlo Ivanov, Univ. of Glasgow (United Kingdom); Jonathan R. Orchard, Compound Semiconductor Technologies Global Ltd. (United Kingdom); Neil D. Gerrard, David T. D. Childs, Richard A. Hogg, Univ. of Glasgow (United Kingdom) [11301-31]

8:50 am: **Advances in regrown all-semiconductor photonic crystal surface-emitting lasers**, Adam F. McKenzie, Univ. of Glasgow (United Kingdom) and Compound Semiconductor Technologies Global Ltd. (United Kingdom); Ben C. King, Zijun Bian, Univ. of Glasgow (United Kingdom); Jonathan R. Orchard, Neil D. Gerrard, Compound Semiconductor Technologies Global Ltd. (United Kingdom); Richard J. E. Taylor, David T. D. Childs, Donald A. MacLaren, Richard A. Hogg, Univ. of Glasgow (United Kingdom) [11301-32]

9:10 am: **940nm 400mW transverse single-mode laser diode with RISA structure**, Jeong-Geun Kwak, Quantum Semiconductor International Inc. (Korea, Republic of) [11301-33]

9:30 am: **Integrated ultra-narrow linewidth stimulated Brillouin scattering (SBS) lasers and their applications (Invited Paper)**, Daniel J. Blumenthal, Univ. of California, Santa Barbara (USA) [11301-34]

Coffee Break. Wed 10:00 am to 10:30 am

SESSION 8

LOCATION: ROOM 306 (LEVEL 3 SOUTH) WED 10:30 AM TO 12:10 PM

Topological Lasers, Laser Arrays, and Metasurfaces

Session Chair: **Alexey Belyanin**, Texas A&M Univ. (USA)

10:30 am: **Topological and supersymmetric laser arrays (Invited Paper)**, Mercedeh Khajavikhan, The Univ. of Southern California (USA); Mohammad Hokmabadi, Jae Hyuck Choi, Demetrios Christodoulides, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [11301-35]

11:00 am: **Towards the experimental demonstration of topological Haldane lattice in microring laser arrays**, Yuzhou G. Liu, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Pawel Jung, Warsaw Univ. of Technology (Poland) and CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA); Midya Parto, William E. Hayenga, Demetrios N. Christodoulides, Mercedeh Khajavikhan, CREOL, The College of Optics and Photonics, Univ. of Central Florida (USA) [11301-36]

11:20 am: **Towards electrically pumped topological insulator lasers**, Jaehyuck Choi, William Hayenga, Midya Parto, Yuzhou Liu, Demetrios Christodoulides, Mercedeh Khajavikhan, Univ. of Central Florida (USA) [11301-37]

11:40 am: **Frequency-agile metasurface quantum-cascade lasers (Invited Paper)**, Christopher A. Curwen, Univ. of California, Los Angeles (USA); John L. Reno, Sandia National Labs. (USA); Benjamin S. Williams, Univ. of California, Los Angeles (USA) [11301-38]

Lunch/Exhibition Break Wed 12:10 pm to 1:40 pm

SESSION 9

LOCATION: ROOM 306 (LEVEL 3 SOUTH) WED 1:40 PM TO 3:20 PM

QCL Frequency Combs and Mode Locking

Session Chair: **Giacomo Scalari**, ETH Zurich (Switzerland)

1:40 pm: **Ultrafast gain dynamics in quantum cascade lasers: new coherent phenomena and their applications (Keynote Presentation)**, Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences (USA) [11301-39]

2:20 pm: **Frequency-comb generation in ring-injection lasers by defect engineering (Invited Paper)**, Marco Piccardo, Harvard Univ. (USA); Benedikt Schwarz, Maximilian Beiser, Technische Univ. Wien (Austria); Dmitry Kazakov, Harvard Univ. (USA); Yongrui Wang, Texas A&M Univ. (USA); Michele Tamagnone, Wei Ting Chen, Alexander Y. Zhu, Harvard Univ. (USA); Alexey Belyanin, Texas A&M Univ. (USA); Federico Capasso, Harvard Univ. (USA) [11301-40]

2:50 pm: **Understanding frequency-modulated combs (Invited Paper)**, Benedikt Schwarz, Nikola Opacak, Technische Univ. Wien (Austria) . [11301-41]

Coffee Break. Wed 3:20 pm to 3:50 pm

SESSION 10

LOCATION: ROOM 306 (LEVEL 3 SOUTH) WED 3:50 PM TO 5:50 PM

QCL Frequency Combs, Mode Locking, and Spectroscopy Applications

Session Chair: **Marco Piccardo**, Harvard Univ. (USA)

3:50 pm: **Broadband THz and mid-IR quantum-cascade-laser frequency combs (Invited Paper)**, Giacomo Scalari, Andres Forrer, Matthew Singley, David Stark, Filippos Kapsalidis, Mattias Beck, Jerome Faist, ETH Zurich (Switzerland) [11301-42]

4:20 pm: **Phase analysis and full phase control of chip-scale infrared frequency combs (Invited Paper)**, Luigi Consolino, Francesco Cappelli, Saverio Bartalini, Paolo De Natale, Istituto Nazionale di Ottica (Italy) [11301-43]

4:50 pm: **Real-time measurement of self-mode-locked pulses in in terahertz quantum cascade lasers by intra-cavity self-detection**, Hua Li, Wenjian Wan, Ziping Li, J. C. Cao, Key Lab. of Terahertz Solid State Technology (China); Sylvie Lepilliet, Jean-François Lampin, Institut d'Electronique de Microélectronique et de Nanotechnologie, CNRS (France); Lorenzo Columbo, Politecnico di Torino (Italy); Massimo Brambilla, Politecnico di Bari (Italy); Stefano Barbieri, Institut d'Electronique de Microélectronique et de Nanotechnologie, CNRS (France) [11301-44]

5:10 pm: **Stabilization of frequency comb interband cascade lasers by time-delayed optical self-injection**, Dominik Auth, Technische Univ. Darmstadt (Germany); Mahmood Bagheri, Clifford Frez, Jet Propulsion Lab. (USA); Chadwick L. Canedy, Igor Vurgaftman, Jerry R. Meyer, U.S. Naval Research Lab. (USA); Stefan Breuer, Technische Univ. Darmstadt (Germany) [11301-45]

5:30 pm: **Realization of GaSb-based DFB lasers and gain chips for the 1.9µm to 3µm spectral regime for molecular spectroscopy**, Martin Honsberg, Sensor Photonics GmbH (Germany); Tobias Milde, Sacher Lasertechnik GmbH (Germany); Sebastian Schmidtman, Sensor Photonics GmbH (Germany); Christian Assmann, Morten Hoppe, Sacher Lasertechnik GmbH (Germany); Joachim R. Sacher, Sacher Lasertechnik GmbH (Germany) and Sensor Photonics GmbH (Germany) [11301-46]

POSTERS-WEDNESDAY

LOCATION: MOSCONE CENTER, LEVEL 3 WEST WED 6:00 PM TO 8:00 PM

Conference attendees are invited to attend the OPTO poster session on Wednesday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field.

Poster Setup: Wednesday 10:00 AM – 5:00 PM

View poster presentation guidelines and set-up instructions at <http://spie.org/PWPPosterGuidelines>

Ultra-short passive external cavity optical self-injection of a semiconductor quantum well laser, Pascal Sauer, Dominik Auth, Christoph Weber, Technische Univ. Darmstadt (Germany); Stefan Meinecke, Kathy Lüdge, Technische Univ. Berlin (Germany); Andreas Klehr, Andrea Knigge, Ferdinand-Braun-Institut (Germany); Stefan Breuer, Technische Univ. Darmstadt (Germany) [11301-61]