

# Aleksandra Foltynowicz

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Google Scholar [https://scholar.google.se/citations?hl=en&user=sLEW\\_4kAAAAJ](https://scholar.google.se/citations?hl=en&user=sLEW_4kAAAAJ)  
Webpage [www.umucombs.org](http://www.umucombs.org)

## EDUCATION/DEGREES

- Docent** (2018) Faculty of Science and Technology, Umeå University, Sweden
- Postdoctoral** JILA, University of Colorado at Boulder, CO, USA  
Advisor: Jun Ye  
*Cavity-enhanced optical frequency comb spectroscopy*
- PhD** (2009) Faculty of Science and Technology, Umeå University, Sweden  
Advisor: Ove Axner  
*“Fiber-laser-based noise-immune cavity-enhanced optical heterodyne molecular spectrometry”*  
available at <http://umu.diva-portal.org/smash/record.jsf?pid=diva2:214195>
- MSc** (2005) Department of Physics, Adam Mickiewicz University, Poznań, Poland  
Advisors: Ove Axner, Ryszard Naskręcki

## EMPLOYMENT

- 2022 - **Professor**, Department of Physics, Umeå University, Sweden
- 2018 - 2022 **Associate professor**, Department of Physics, Umeå University, Sweden
- 2012 - 2017 **Assistant professor**, Department of Physics, Umeå University, Sweden
- 2010 - 2012 **Postdoctoral research associate**, JILA, University of Colorado at Boulder, CO, USA
- 2004 - 2009 **Graduate student**, Department of Physics, Umeå University, Sweden

## RESEARCH GRANTS

- 2025 - 2027 Kempestiftelserna and Carl-Trygger Foundation equipment grant
- 2022 - 2026 Knut and Alice Wallenberg Foundation Academy Fellow prolongation
- 2021 - 2026 Swedish Research Council Consolidator Grant
- 2017 - 2020 Swedish Research Council Project Grant
- 2016 - 2021 Knut and Alice Wallenberg Foundation Academy Fellow
- 2015 - 2016 Carl-Trygger Foundation
- 2013 - 2016 Swedish Foundation for Strategic Research Ingvar Carlsson Award 5
- 2013 - 2016 Swedish Research Council Junior Researcher Project Grant
- 2014 - 2015 Kempestiftelserna postdoctoral stipend
- 2013 - 2014 Carl-Trygger Foundation equipment grant
- 2013 Stiftelsen Lars Hiertas Minne equipment grant

## SCHOLARSHIPS

2012	Swedish Research Council homing fellowship
2010 - 2011	Swedish Research Council postdoctoral fellowship
2010	The Wenner-Gren Foundations postdoctoral fellowship (declined)
2003 - 2004	European Physical Society university student fellowship

## AWARDS

2025	Optica Fellow <a href="https://www.optica.org/get_involved/awards_and_honors/fellow_members/fellow_profiles/aleksandra_foltynowicz/">https://www.optica.org/get_involved/awards_and_honors/fellow_members/fellow_profiles/aleksandra_foltynowicz/</a>
2019	Coblentz Award at ISMS2019 <a href="http://www.coblentz.org/awards/the-coblentz-award">http://www.coblentz.org/awards/the-coblentz-award</a>
2016	Peter Werle Early Career Scientist Award at FLAIR2016 <a href="https://flair2016.sciencesconf.org/resource/page/id/11.html">https://flair2016.sciencesconf.org/resource/page/id/11.html</a>
2015	Young Researcher Award from the Royal Skyttean Society
2013 - 2016	Ingvar Carlsson Award 5 from the Swedish Foundation for Strategic Research

## SUPERVISION OF STUDENTS AND POSTDOCS

PhD Students	Andrea Rosina, Adrian Hjältén (PhD 2023), Chuang Lu (PhD 2022), Alexandra C. Johansson (PhD 2018), Thomas Hausmaninger (co-supervisor, PhD 2018), Amir Khodabakhsh (PhD 2017)
Postdocs	Qinxue Nie, Yuan Cao, Aleksandr Balashov, Adrian Hjältén, Matthias Germann, Vinicius Silva de Oliveira, Francisco Senna Vieira, Ibrahim Sadiq, Grzegorz Soboń, Lucile Rutkowski, Venkata Ramaiah Badarla, Chadi Abd Alrahman, Hsuan-Chen Chen

## EDITORIAL ASSIGNMENTS

- Associate editor of **Optics Express**, since Aug 2023
- Co-editor of **Applied Physics B**, since Sept 2021
- Co-guest editor of special issue of **Journal of Molecular Spectroscopy** dedicated to 'Frequency combs', 2018

## CONFERENCE ORGANIZATION

### General Chair

- European Quantum Electronics Conference (EQEC), Munich, Germany, 2025

### Program Chair

- International Conference on Spectral Line Shapes (ICSLs), Luleå, Sweden, 2026
- Atomic, Molecular and Optical Physics session of Fysikdagarna, Swedish Physical Society, Luleå, Sweden, 2025
- European Quantum Electronics Conference (EQEC), Munich, Germany, 2023

### Sub-Committee Chair

- European Quantum Electronics Conference (EQEC): Precision Metrology and Frequency Combs (ED), Munich 2021

- Light, Energy and the Environment Congress: Optics and Photonics for Energy & the Environment (E2), Singapore 2018

### **Committee/Board Member**

- International Symposium on Molecular Spectroscopy, ISMS, since 2026
- FLAIR advisory board, since 2018
- Board member of the Atomic, Molecular and Optical Physics Section of the Swedish Physical Society, 2018 - 2025
- Cavity Enhanced Spectroscopy meeting, Lecco, Italy 2022
- High Brightness Sources and Light-Driven Interactions Congress: Mid-infrared Coherent Sources Topical Meeting, Budapest, Hungary 2022
- European Quantum Electronics Conference (EQEC): Precision Metrology and Frequency Combs (ED), Munich, Germany, 2019
- Optical Sensors and Sensing Congress: Optics and Photonics for Sensing the Environment (EM), within, San Jose, Ca 2019
- Co-organizer of mini-symposium on ‘Frequency comb spectroscopy’ for the 73<sup>rd</sup> International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, 2018
- Light, Energy and the Environment Congress: Fourier Transform Spectroscopy (FTS) Meeting, Leipzig, Germany, 2016
- CLEO: Active Optical Sensing, San Jose, CA, 2015-2017

### **REVIEWER FOR JOURNALS**

- Science, • Nature Photonics, • Nature Communications, • Optica, • Scientific Reports,
- Optics Express, • Optics Letters, • Applied Physics Reviews, • APL Photonics,
- Applied Physics B, • Journal of Quantitative Spectroscopy and Radiative Transfer,
- Communications Chemistry, • Review of Scientific Instruments, • Physics Letters A,
- Flow, Turbulence and Combustion, • Spectrochimica Acta A, • Vacuum
- Journal of the Optical Society of America B, • Atmospheric Measurement Techniques,
- Journal of Selected Topics in Quantum Electronics, • Measurement Science and Technology,
- Laser and Photonics Reviews

### **REVIEWER FOR FUNDING AGENCIES**

- European Research Council, • Swedish Research Council: International Postdoc,
- Science Foundation Ireland, • Fund for Scientific Research, FNRS, Belgium,
- Helmholtz Young Investigators Group, Germany, • Polish National Science Centre,
- Netherlands Organisation for Scientific Research, • Leverhulme Trust, UK,
- Austrian Science Fund

### **PLENARY TALKS**

1. *Molecular spectroscopy with optical frequency comb*  
Swedish Physics Days, Luleå, Sweden, Aug 2025
2. *Optical frequency comb Fourier transform spectroscopy*  
74<sup>th</sup> International Symposium on Molecular Spectroscopy (ISMS), Champaign-Urbana, IL, USA, Jun 2019
3. *Precision Fourier transform spectroscopy using optical frequency combs (within ‘Spectroscopy for bright future’)*

- 25<sup>th</sup> Colloquium on High Resolution Molecular Spectroscopy, Helsinki, Finland, Sept 2017
4. *Frequency comb spectroscopy and applications.*  
Field Laser Applications in Industry and Research, Murnau, Germany, Sept 2011

## INVITED TALKS

1. *Precision spectroscopy of fundamental and hot-band molecular transitions using optical frequency combs*  
17<sup>th</sup> Biennial HITRAN Conference, Cambridge, MA, USA, Jun 2024
2. *Optical-optical double-resonance spectroscopy using a frequency comb probe – broadband precision measurements of molecular hot-band transitions*  
European Conference on Nonlinear Optical Spectroscopy (ECONOS), Vienna, Austria, Apr 2024
3. *Precision molecular spectroscopy using optical frequency combs*  
European Group on Atomic Systems (EGAS), Strasbourg, France, Jun 2023
4. *Precision frequency comb spectroscopy in the 8  $\mu\text{m}$  range*  
Conference on Lasers and Electro-Optics (CLEO): Topical review ‘Frequency comb spectroscopy: from the VUV to THz’, San Jose, CA, USA, May 2023
5. *Precision spectroscopy using optical frequency combs – toward better understanding of exoplanetary spectra*  
Optics and Photonics in Sweden, Umeå, Sweden, Oct 2022
6. *Comb-based Fourier transform spectroscopy*  
The 3<sup>rd</sup> QUADMARTS workshop, Rennes, France, Nov 2021
7. *High-resolution optical frequency comb Fourier transform spectroscopy*  
European Optical Society Annual meeting (EOSAM) 2021, Ultrafast Optical Technologies and Applications, Rome, Italy, Sept 2021 (hybrid/online)
8. *Mid-infrared comb-based Fourier transform spectroscopy*  
High-brightness Sources and Light-driven Interactions Congress: Mid-infrared Coherent Sources, Nov 2020 (online)
9. *Cavity-enhanced comb-based Fourier transform spectroscopy*  
13<sup>th</sup> International User Meeting on Cavity Enhanced Spectroscopy, Madison, WI, USA, Jun 2019
10. *Precision Fourier transform spectroscopy using optical frequency combs*  
Conference on Lasers and Electro-Optics: Optical Metrology, San Jose, CA, USA, May 2019
11. *Optical frequency comb spectroscopy*  
Optics and Photonics in Sweden, Linköping, Sweden, Nov 2016
12. *Cavity-enhanced optical frequency combs spectroscopy in the near- and mid-infrared*  
Laser Applications to Chemical, Security and Environmental Analysis (LACSEA), Heidelberg, Germany, Jul 2016
13. *High-resolution optical frequency comb spectroscopy*  
23<sup>rd</sup> International Conference on Spectral Line Shapes, Toruń, Poland, Jun 2016
14. *Broadband molecular detection with cavity-enhanced optical frequency comb spectroscopy*  
Light, Energy and the Environment Congress: Optics and Photonics for Energy & the Environment (E2), Canberra, Australia, Dec 2014
15. *Optical frequency comb spectroscopy*  
Swedish Physical Society section for AMO Physics meeting, Nordic Physics Days, Lund, Sweden, Jun 2013

16. *Cavity-enhanced optical frequency comb spectroscopy*  
Cavity Enhanced Spectroscopy, Kingston, ON, Canada, Jun 2011

## PEER-REVIEWED PUBLICATIONS

1. A. Hjältén, V. Silva de Oliveira, M. Rey, I. Silander, K. K. Lehmann, and **A. Foltynowicz**  
*Measurement and assignment of E-symmetry states in the 6010-6110  $\text{cm}^{-1}$  and 8940-9150  $\text{cm}^{-1}$  ranges of methane using optical frequency comb double-resonance spectroscopy*  
arXiv: [2512.05697](https://arxiv.org/abs/2512.05697)
2. I. Sadiék, A. Hjältén, G. Friedrichs, and **A. Foltynowicz**  
*HNO dimerization as a chemical reference standard for  $\text{N}_2\text{O}$  isotopomer ratio: ab initio calculations, formation kinetics, and frequency comb spectroscopy*  
JACS **147**, 38110-38127 (2025)
3. K. K. Lehmann, A. Hjältén, I. Silander, M. Rey, and **A. Foltynowicz**  
*Assignment of collision-induced four-level double-resonance transitions in the  $3\nu_3 \leftarrow \nu_3$  spectral region of methane*  
J. Chem. Phys. **163**, 144304 (2025)
4. V. Silva de Oliveira, A. Hjältén, I. Silander, A. Rosina, M. Rey, K. K. Lehmann, and **A. Foltynowicz**  
*Combined frequency comb and continuous wave cavity-enhanced optical-optical double resonance spectrometer in the 1.7  $\mu\text{m}$  range*  
Opt. Express **33**, 38776-38802 (2025)
5. A. Hjältén, I. Sadiék, and **A. Foltynowicz**  
*Precision frequency comb spectroscopy of the  $^{14}\text{N}_2\text{O}$ ,  $^{14}\text{N}^{15}\text{NO}$ ,  $^{15}\text{N}^{14}\text{NO}$ , and  $^{15}\text{N}_2\text{O}$  isotopocules in the 3300 – 3550  $\text{cm}^{-1}$  range*  
J. Quant. Spectr. Radiat. Transfer **340**, 109452 (2025)
6. K. Chubb, S. Robert, C. Sousa-Silva, S. N. Yurchenko, N. F. Allard, V. Boudon, J. Buldyreva, B. Bultel, A. Coustenis, **A. Foltynowicz**, I. E. Gordon, R. J. Hargreaves, C. Helling, C. Hill, H. Rafn Hrodmarsson, T. Karman, H. Lecoq-Molinos, A. Migliorini, M. Rey, C. Richard, I. Sadiék, F. Schmidt, A. Sokolov, S. Stefani, J. Tennyson, O. Venot, S. O. M. Wright, R. Arenales-Lope, J. K. Barstow, A. Bocchieri, N. Carrasco, D. Dubey, O. Egorov, A. García Muñoz, E. Gharib-Nezhad, L. Gkouvelis, F. Grübel, P. G. J. Irwin, A. Knižek, D. A. Lewis, M. G. Lodge, S. Ma, Z. Martins, K. Molaverdikhani, G. Morello, A. Nikitin, E. Panek, M. Rengel, G. Rinaldi, J. W. Skinner, G. Tinetti, T. A. van Kempen, J. Yang, T. Zingales  
*Data availability and requirements relevant for the Ariel space mission and other exoplanet atmosphere applications*  
RAS Techniques and Instruments **3**, 636 (2024)
7. A. Hjältén, V. Silva de Oliveira, I. Silander, A. Rosina, M. Rey, L. Rutkowski, G. Sobon, K. K. Lehmann, and **A. Foltynowicz**  
*Measurement and assignment of  $J = 5$  to 9 rotational energy levels in the 9070-9370  $\text{cm}^{-1}$  range of methane using optical frequency comb double-resonance spectroscopy*  
J. Chem. Phys. **161**, 124311 (2024)
8. V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz**  
*Addendum: Sub-Doppler optical-optical double-resonance spectroscopy using a cavity-enhanced frequency comb probe*  
Nat. Commun. **15**, 7410 (2024)
9. D. Tomaszewska-Rolla, P. Jaworski, D. Wu, F. Yu, **A. Foltynowicz**, K. Krzempek, and G. Soboń

- Mid-infrared optical frequency comb spectroscopy using an all-silica antiresonant hollow-core fiber*  
Opt. Express **32**, 10679-10689 (2024)
10. V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz**  
*Sub-Doppler optical-optical double-resonance spectroscopy using a cavity-enhanced frequency comb probe*  
Nat. Commun. **15**, 161 (2024)
  11. J. Zakrisson, I. Silander, V. Silva de Oliveira, A. Hjältén, A. Rosina, T. Rubin, **A. Foltynowicz**, M. Zelan, and O. Axner  
*Procedure for automated low uncertainty assessment of empty cavity mode frequencies in Fabry-Pérot cavity based refractometry*  
Opt. Express **32**, 3959-3973 (2024)
  12. M. Germann, A. Hjältén, J. Tennyson, S.N. Yurchenko, I. E. Gordon, C. Pett, I. Silander, K. Krzempek, A. Hudzikowski, A. Głuszek, G. Soboń, and **A. Foltynowicz**  
*Optical frequency comb Fourier transform spectroscopy of formaldehyde in the 1250 to 1390  $\text{cm}^{-1}$  range: experimental line list and improved MARVEL analysis*  
J. Quant. Spectr. Radiat. Transf. **312**, 108782 (2023)
  13. A. Hjältén, I. Sadiék, and **A. Foltynowicz**  
*Line positions and intensities of the  $\nu_1$  band of  $^{12}\text{CH}_3\text{I}$  using mid-infrared optical frequency comb Fourier transform spectroscopy*  
J. Quant. Spectr. Radiat. Transf. **306**, 108646 (2023)
  14. I. Sadiék, A. Hjältén, F. C. Roberts, J. H. Lehman, and **A. Foltynowicz**  
*Optical frequency comb-based measurements and revisited assignment of high-resolution spectra of  $\text{CH}_2\text{Br}_2$  in the 2960 to 3120  $\text{cm}^{-1}$  region*  
Phys. Chem. Chem. Phys. **25**, 8743-8754 (2023)
  15. I. Silander, J. Zakrisson, V. Silva de Oliveira, C. Forssén, **A. Foltynowicz**, T. Rubin, M. Zelan, and O. Axner  
*In situ determination of the penetration depth of mirrors in Fabry-Perot refractometers and its influence on assessment of refractivity and pressure*  
Opt. Express **30**, 25891-25906 (2022)
  16. M. Germann, A. Hjältén, V. Boudon, C. Richard, K. Krzempek, A. Hudzikowski, A. Głuszek, G. Soboń, and **A. Foltynowicz**  
*A methane line list with sub-MHz accuracy in the 1250 to 1380  $\text{cm}^{-1}$  range from optical frequency comb Fourier transform spectroscopy*  
J. Quant. Spectr. Radiat. Transf. **288**, 108252 (2022)
  17. C. Lu, J. Morville, L. Rutkowski, I. Silander, and **A. Foltynowicz**  
*Cavity-enhanced frequency comb Vernier spectroscopy (invited review)*  
Photonics **9**, 222 (2022)
  18. I. E. Gordon, L. S. Rothman, R. J. Hargraves, ..., **A. Foltynowicz**, ..., I. Sadiék, ...  
*The HITRAN2020 molecular spectroscopic database*  
J. Quant. Spectr. Radiat. Transf. **277**, 107949 (2022)
  19. C. Lu, F. Senna Vieira, A. Głuszek, I. Silander, G. Sobon, and **A. Foltynowicz**  
*Robust, fast and sensitive near-infrared continuous-filtering Vernier spectrometer*  
Opt. Express **29**, 30155-30167 (2021)
  20. K. Krzempek, D. Tomaszewska, **A. Foltynowicz**, and G. Soboń  
*Fiber-based optical frequency comb at 3.3  $\mu\text{m}$  for broadband spectroscopy of*

*hydrocarbons (invited)*

Chinese Opt. Lett. **19**, 081406 (2021)

21. A. Hjältén, M. Germann, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, G. Soboń, and **A. Foltynowicz**  
*Optical frequency comb Fourier transform spectroscopy of  $^{14}\text{N}_2^{16}\text{O}$  at  $7.8\ \mu\text{m}$*   
J. Quant. Spectrosc. Radiat. Transfer **271**, 107734 (2021)
22. O. Szewczyk, P. Pala, K. Tarnowski, J. Olszewski, F. Senna Vieira, C. Lu, **A. Foltynowicz**, P. Mergo, J. Sotor, G. Soboń, and T. Martynkien  
*Dual-wavelength pumped highly birefringent microstructured silica fiber for widely tunable soliton self-frequency shift*  
IEEE J. Lightwave Technol. **39**, 3260-3268 (2021)
23. **A. Foltynowicz**, L. Rutkowski, I. Silander, A. C. Johansson, V. Silva de Oliveira, O. Axner, G. Soboń, T. Martynkien, P. Mergo, and K. K. Lehmann  
*Sub-Doppler double-resonance spectroscopy of methane using a frequency comb probe*  
Phys. Rev. Lett. **126**, 063001 (2021)
24. **A. Foltynowicz**, L. Rutkowski, I. Silander, A. C. Johansson, V. Silva de Oliveira, O. Axner, G. Soboń, T. Martynkien, P. Mergo, and K. K. Lehmann  
*Measurement and assignment of double-resonance transitions to the  $8900\text{-}9100\ \text{cm}^{-1}$  levels of methane*  
Phys. Rev. A **103**, 022810 (2021)
25. I. Sadiék, A. Hjältén, F. Senna Vieira, C. Lu, M. Stühr, and **A. Foltynowicz**  
*Line positions and intensities of the  $\nu_4$  band of methyl iodide using mid-infrared optical frequency comb Fourier transform spectroscopy*  
J. Quant. Spectr. Radiat. Transf. **255**, 197263 (2020)
26. A. Głuszek, F. Senna Vieira, A. Hudzikowski, A. Wąż, J. Sotor, **A. Foltynowicz**, and G. Soboń  
*Compact mode-locked Er-doped fiber laser for broadband cavity-enhanced spectroscopy*  
Appl. Phys B **126**, 137 (2020)
27. K. Krzempek, D. Tomaszewska, A. Gluszek, T. Martynkien, P. Mergo, J. Sotor, **A. Foltynowicz**, and G. Soboń  
*Stabilized all-fiber source for generation of tunable broadband  $f_{\text{CEO}}$ -free mid-IR frequency comb in the  $7\text{-}9\ \mu\text{m}$  range*  
Opt. Express **27**, 37435-45 (2019)
28. C. Lu, F. Senna Vieira, F. M. Schmidt, and **A. Foltynowicz**  
*Time-resolved continuous-filtering Vernier spectroscopy of  $\text{H}_2\text{O}$  and OH radical in a flame*  
Opt. Express **27**, 29521-33 (2019)
29. I. Sadiék, T. Mikkonen, M. Vainio, J. Toivonen, and **A. Foltynowicz**  
*Optical frequency comb photoacoustic spectroscopy*  
Phys. Chem. Chem. Phys. **20**, 27849-55 (2018)
30. A. C. Johansson, L. Rutkowski, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, and **A. Foltynowicz**  
*Broadband calibration-free cavity-enhanced complex refractive index spectroscopy using a frequency comb*  
Opt. Express **26**, 20633-48 (2018)
31. A. C. Johansson, J. Westberg, G. Wysocki, and **A. Foltynowicz**  
*Optical frequency comb Faraday rotation spectroscopy*  
Appl. Phys. B **124**, 79 (2018)

32. L. Rutkowski, **A. Foltynowicz**, F. M. Schmidt, A. C. Johansson, A. Khodabakhsh, A. A. Kyuberis, N. F. Zobov, O. L. Polyansky, S. N. Yurchenko, and J. Tennyson  
*An experimental water line list at 1950 K in the 6250-6670 cm<sup>-1</sup> region*  
J. Quant. Spectr. Radiat. Transf. **205**, 213-219 (2018)
33. L. Rutkowski, P. Masłowski, A. C. Johansson, A. Khodabakhsh, and **A. Foltynowicz**  
*Optical frequency comb Fourier transform spectroscopy with sub-nominal resolution and precision beyond the Voigt profile*  
J. Quant. Spectr. Radiat. Transf. **204**, 63-73 (2018)
34. L. Rutkowski, A. C. Johansson, G. Zhao, T. Hausmaninger, A. Khodabakhsh, O. Axner, and **A. Foltynowicz**  
*Sensitive and broadband measurement of dispersion in a cavity using a Fourier transform spectrometer with kHz resolution*  
Opt. Express **25**, 21711-18 (2017)
35. A. Khodabakhsh, L. Rutkowski, J. Morville, and **A. Foltynowicz**  
*Mid-infrared continuous-filtering Vernier spectroscopy using a doubly resonant optical parametric oscillator*  
Appl. Phys. B **123**, 210 (2017)
36. G. Soboń, T. Martynkien, P. Mergo, L. Rutkowski, and **A. Foltynowicz**  
*High-power frequency comb source tunable from 2.7 to 4.2 μm based on difference frequency generation pumped by an Yb-doped fiber laser (editor's choice)*  
Opt. Lett. **42**, 1748-51 (2017)
37. A. C. Johansson, L. Rutkowski, A. Khodabakhsh, and **A. Foltynowicz**  
*Signal line shapes of Fourier transform cavity-enhanced frequency modulation spectroscopy with optical frequency combs*  
J. Opt. Soc. Am. B **34**, 358-365 (2017)
38. L. Rutkowski, A. C. Johansson, D. Valiev, A. Khodabakhsh, A. Tkacz, F. M. Schmidt, and **A. Foltynowicz**  
*Detection of OH in an atmospheric flame at 1.5 μm using optical frequency comb spectroscopy*  
Phot. Lett. Pol. **8**, 110-112 (2016)
39. A. Khodabakhsh, V. Ramaiah-Badarla, L. Rutkowski, A. C. Johansson, K. F. Lee, J. Jiang, C. Mohr, M. E. Fermann, and **A. Foltynowicz**  
*Fourier transform and Vernier spectroscopy using an optical frequency comb at 3-5.4 μm*  
Opt. Lett. **41**, 2541-44 (2016)
40. P. Masłowski, K. F. Lee, A. C. Johansson, A. Khodabakhsh, G. Kowzan, L. Rutkowski, A. A. Mills, C. Mohr, J. Jiang, M. E. Fermann, and **A. Foltynowicz**  
*Surpassing the path-limited resolution of a Fourier transform spectrometer with frequency combs*  
Phys. Rev. A **93**, 021802(R) (2016)
41. A. Khodabakhsh, A. C. Johansson, and **A. Foltynowicz**  
*Noise-immune cavity-enhanced optical frequency comb spectroscopy: a sensitive technique for high-resolution broadband molecular detection*  
Appl. Phys. B **119**, 87-95 (2015)
42. P. Ehlers, A. C. Johansson, I. Silander, **A. Foltynowicz**, and O. Axner  
*Use of etalon-immune-distances to reduce the influence of background signals in frequency modulation spectroscopy and noise-immune cavity-enhanced optical heterodyne molecular spectroscopy*  
J. Opt. Soc. Am B **31**, 2938-45 (2014)

43. A. Khodabakhsh, C. Abd Alrahman, and **A. Foltynowicz**  
*Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
Opt. Lett. **39**, 5034-38 (2014)
44. C. Abd Alrahman, A. Khodabakhsh, F. M. Schmidt, Z. Qu, and **A. Foltynowicz**  
*Cavity-enhanced optical frequency comb spectroscopy of high-temperature H<sub>2</sub>O in a flame*  
Opt. Express **22**, 13889-95 (2014).
45. P. Ehlers, J. Wang, I. Silander, **A. Foltynowicz**, and O. Axner  
*Fiber-laser-based NICE-OHMS incorporating an optical circulator*  
Opt. Lett. **39**, 279-282 (2014)
46. I. Silander, M. Zelan, O. Axner, F. Arrhen, L. Pendrill, and **A. Foltynowicz**  
*Optical measurement of the gas number density in a Fabry-Perot cavity*  
Meas. Sci. Instr. **24**, 105207 (2013)
47. **A. Foltynowicz**, P. Masłowski, A. J. Fleisher, B. J. Bjork, and J. Ye  
*Cavity-enhanced optical frequency comb spectroscopy in the mid-infrared – application to trace detection of hydrogen peroxide*  
Appl. Phys. B **110**, 163–175 (2013)
48. M. Golkowski, C. Golkowski, J. Leszczynski, R. Plimpton, P. Masłowski, **A. Foltynowicz**, J. Ye, and B. McCollister  
*Hydrogen peroxide enhanced nonthermal plasma effluent for biomedical applications*  
IEEE Trans. Plasma Sci. **40**, 1984-91 (2012)
49. **A. Foltynowicz**, T. Ban, P. Masłowski, F. Adler, and J. Ye  
*Quantum-noise-limited optical frequency comb spectroscopy (editor's choice and selected for a Viewpoint in Physics)*  
Phys. Rev. Lett. **107**, 233002 (2011)
50. **A. Foltynowicz**, I. Silander, and O. Axner  
*Reduction of background signals in fiber-based NICE-OHMS*  
J. Opt. Soc. Am. B **28**, 2797-2805 (2011)
51. **A. Foltynowicz**, P. Masłowski, T. Ban, F. Adler, K. C. Cossel, T. C. Briles, and J. Ye  
*Optical frequency comb spectroscopy*  
Faraday Disc. **150**, 23-31 (2011)
52. F. Adler, P. Masłowski, **A. Foltynowicz**, K. C. Cossel, T. C. Briles, I. Hartl, and J. Ye  
*Mid-infrared Fourier transform spectroscopy with a broadband frequency comb*  
Opt. Express **18**, 21861-21872 (2010)
53. **A. Foltynowicz**, J. Wang, P. Ehlers, and O. Axner  
*Distributed-feedback-laser-based NICE-OHMS in the pressure-broadened regime*  
Opt. Express **18**, 18580-18591 (2010)
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## POPULAR SCIENCE LECTURES AND ARTICLES

1. *Detektion av gravitationsvågor med LIGO-Virgo*  
in Kosmos, Swedish Physical Society årsbok, Dec 2021
2. *Detection of molecules with optical frequency combs*  
in THULE 2016, Kungliga Skytteanska samfundets årsbok

## CONFERENCE CONTRIBUTIONS

1. *Comb spectroscopy of halogenated volatile organic compounds*  
I. Sadiék, A. Hjältén, J. H. Lehman, and **A. Foltynowicz** (talk)  
124th Annual Conference of the German Bunsen Society for Physical Chemistry, Leipzig, Germany, Mar 2025
2. *A chemical reference standard for N<sub>2</sub>O isotopomer ratio*  
I. Sadiék, A. Hjältén, G. Friedrichs, and **A. Foltynowicz** (talk?)  
124th Annual Conference of the German Bunsen Society for Physical Chemistry, Leipzig, Germany, Mar 2025
3. *Optical-optical double-resonance polarization spectroscopy using a cavity-enhanced frequency comb probe*  
A. Rosina, I. Silander, V. Silva de Oliveira, A. Hjältén, K.K. Lehmann, and **A. Foltynowicz** (poster)  
KBC days, Umeå University, Sweden, Nov 2024
4. *Measurement and assignment of high rotational energy levels in the 9070-9370 cm<sup>-1</sup> range of methane using optical frequency comb double-resonance spectroscopy*  
A. Hjältén, V. Silva de Oliveira, I. Silander, A. Rosina, M. Rey, L. Rutkowski, G. Soboń, K.K. Lehmann, and **A. Foltynowicz** (oral)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2024
5. *Comb-based cavity-enhanced optical-optical double-resonance spectrometer with 1.64 – 1.80 μm spectral coverage*  
V. Silva de Oliveira, A. Rosina, I. Silander, A. Hjältén, L. Rutkowski, G. Soboń, K.K. Lehmann, and **A. Foltynowicz** (poster)  
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6. *Optical-optical double-resonance polarization spectroscopy using a cavity-enhanced frequency comb probe*  
A. Rosina, I. Silander, V. Silva de Oliveira, A. Hjältén, K.K. Lehmann, and **A. Foltynowicz** (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2024
7. *Mid-IR pump, near-IR frequency comb probe double resonance study of CH<sub>4</sub> levels in the 3ν<sub>3</sub> spectral region*  
A. Hjältén, V. Silva de Oliveira, I. Silander, A. Rosina, **A. Foltynowicz**, M. Rey, L. Rutkowski, G. Soboń, and K.K. Lehmann (oral)  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2024
8. *Cavity-enhanced optical frequency comb double-resonance spectroscopy of high vibrational energy levels of methane*  
A. Rosina, A. Hjältén, V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, M. Rey, K.K. Lehmann, and **A. Foltynowicz** (oral)  
QUADMARTS Summer School, Corsica, France, Jun 2024

9. *Measurement and assignment of hot-band methane transitions using cavity-enhanced comb-based double-resonance spectroscopy*  
V. Silva de Oliveira, I. Silander, A. Hjältén, A. Rosina, L. Rutkowski, G. Soboń, O. Axner, K.K. Lehmann, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2023
10. *Cavity-enhanced frequency-comb-based optical-optical double-resonance spectrometer*  
A. Rosina, V. Silva de Oliveira, I. Silander, A. Hjältén, L. Rutkowski, G. Soboń, K.K. Lehmann, and **A. Foltynowicz** (poster)  
CLEO/EU-EQEC, Munich, Germany, Jun 2023
11. *High accuracy line lists of CH<sub>4</sub> and H<sub>2</sub>CO in the 8 μm range from optical frequency comb Fourier transform spectroscopy*  
M. Germann, A. Hjältén, V. Boudon, C. Richard, J. Tennyson, S. Yurchenko, I.E. Gordon, C. Pett, I. Silander, K. Krzempek, A. Hudzikowski, A. Głuszek, G. Soboń, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2023
12. *Mid-IR optical frequency comb Fourier transform spectroscopy using an antiresonant hollow-core fiber*  
D. Tomaszewska-Rolla, P. Jaworski, D. Wu, F. Yu, **A. Foltynowicz**, G. Soboń, and K. Krzempek (oral)  
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13. *Measurement and assignment of methane hot-band transitions using cavity-enhanced frequency comb double resonance spectroscopy: extending to higher J states*  
V. Silva de Oliveira, I. Silander, A. Hjältén, **A. Foltynowicz**, A. Rosina, L. Rutkowski, G. Soboń, and K.K. Lehmann (oral)  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2023
14. *Modeling the optical-optical double resonance lineshapes in CH<sub>4</sub>*  
V. Silva de Oliveira, I. Silander, A. Hjältén, A. Rosina, **A. Foltynowicz**, L. Rutkowski, and K.K. Lehmann (oral)  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2023
15. *Line positions and intensities of <sup>12</sup>CH<sub>3</sub>I around 2971 cm<sup>-1</sup> from frequency comb Fourier transform spectroscopy*  
I. Sadiék, A. Hjältén, and **A. Foltynowicz** (poster)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2023
16. *Accurate measurement and assignment of high rotational energy levels of the 3ν<sub>3</sub> ← ν<sub>3</sub> band of methane*  
A. Hjältén, V. Silva de Oliveira, I. Silander, A. Rosina, L. Rutkowski, G. Soboń, K.K. Lehmann, and **A. Foltynowicz** (oral)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2023
17. *Double-resonance spectroscopy of methane in the 3ν<sub>3</sub> ← ν<sub>3</sub> region using a frequency comb probe*  
V. Silva de Oliveira, I. Silander, A. Hjältén, L. Rutkowski, G. Soboń, O. Axner, K.K. Lehmann, and **A. Foltynowicz** (poster)  
Optics and Photonics in Sweden, Umeå, Sweden, Oct 2022
18. *Optical frequency comb Fourier transform spectrometer for high-accuracy line position retrieval in the 8 μm range*  
A. Hjältén, M. Germann, V. Boudon, C. Richard, S. Yurchenko, J. Tennyson, I. Silander, C. Pett, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska-Rolla, G. Soboń, and **A. Foltynowicz** (poster)  
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19. *Optical-optical double-resonance spectroscopy of methane using a cavity-enhanced frequency comb probe*  
V. Silva de Oliveira, I. Silander, A. Hjältén, L. Rutkowski, G. Soboń, O. Axner, K.K. Lehmann, and **A. Foltynowicz** (oral)  
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20. *Highly accurate line lists of N<sub>2</sub>O, CH<sub>4</sub> and H<sub>2</sub>CO in the 8 μm range from optical frequency comb Fourier transform spectroscopy*  
A. Hjältén, M. Germann, V. Boudon, C. Richard, S. Yurchenko, J. Tennyson, I. Silander, C. Pett, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska-Rolla, G. Soboń, and **A. Foltynowicz** (oral)  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2022
21. *Optical frequency comb based measurements and revisited assignment of high-resolution spectra of CH<sub>2</sub>Br<sub>2</sub> in the 3.3 μm region*  
I. Sadiq, A. Hjältén, F. C. Roberts, J. H. Lehman, and **A. Foltynowicz** (poster)  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2022
22. *High-accuracy line lists of methane and formaldehyde between 1240 and 1380 cm<sup>-1</sup> from Fourier transform optical frequency comb spectroscopy*  
M. Germann, A. Hjältén, I. Silander, C. Pett, **A. Foltynowicz**, V. Boudon, C. Richard, K. Krzempek, A. Hudzikowski, A. Głuszek, G. Soboń, and (oral)  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2022
23. *High-accuracy line positions of N<sub>2</sub>O, CH<sub>4</sub> and H<sub>2</sub>CO around 8 μm from optical frequency comb Fourier transform spectroscopy*  
A. Hjältén, M. Germann, I. Silander, **A. Foltynowicz**, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, G. Soboń, V. Boudon, C. Richard, and C. Pett (oral)  
14<sup>th</sup> International User Meeting on Cavity Enhanced Spectroscopy, Lecco, Italy, Jun 2022
24. *Cavity-enhanced double-resonance spectroscopy of methane using a frequency comb probe*  
V. Silva de Oliveira, I. Silander, A. Hjältén, L. Rutkowski, G. Soboń, O. Axner, K.K. Lehmann, and **A. Foltynowicz** (oral)  
14<sup>th</sup> International User Meeting on Cavity Enhanced Spectroscopy, Lecco, Italy, Jun 2022
25. *An accurate methane line list in the 7.2-8 μm range from comb-based Fourier transform spectroscopy*  
M. Germann, A. Hjältén, V. Boudon, C. Richard, K. Krzempek, A. Hudzikowski, A. Głuszek, G. Soboń, and **A. Foltynowicz** (oral)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2022 (hybrid)
26. *Measurement and assignment of hot-band methane transitions with sub-MHz accuracy*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, O. Axner, K.K. Lehmann, and **A. Foltynowicz** (oral)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2022 (hybrid)
27. *Kompaktowy optyczny grzebień częstotliwości na zakres 7 – 9 μm dla potrzeb spektroskopii laserowej*  
G. Soboń, K. Krzempek, A. Głuszek, A. Hudzikowski, A. Hjältén, M. Germann, **A. Foltynowicz**  
Polska Konferencja Optyczna 2022, Płock, Poland, Jun 2022
28. *Cavity-enhanced sub-Doppler optical-optical double-resonance spectroscopy of methane using a frequency comb.*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz**  
European Optical Society Annual meeting (EOSAM) 2021, Ultrafast Optical Technologies and Applications, Rome, Italy, Sept 2021 (hybrid/online)

29. *High-precision line positions of  $N_2O$  and  $CH_4$  at  $8 \mu m$  from optical frequency comb Fourier transform spectroscopy*  
M. Germann, A. Hjältén, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, G. Soboń, and **A. Foltynowicz** (oral)  
27th Colloquium on High Resolution Molecular Spectroscopy, Aug 2021 (online)
30. *High-resolution measurements of rovibrational spectra of methyl iodide in the  $3.3 \mu m$  range using frequency comb Fourier transform spectroscopy*  
A. Hjältén, I. Sadiék, F. Senna Vieira, C. Lu, M. Stuhr, and **A. Foltynowicz** (poster)  
27th Colloquium on High Resolution Molecular Spectroscopy, Aug 2021 (online)
31. *Cavity-enhanced sub-Doppler optical-optical double-resonance spectroscopy of methane using a frequency comb probe*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, O. Axner, G. Soboń, K. K. Lehmann, and **A. Foltynowicz** (poster)  
27th Colloquium on High Resolution Molecular Spectroscopy, Aug 2021 (online)
32. *Sub-Doppler optical-optical double-resonance spectroscopy of methane using a frequency comb probe*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, A. C. Johansson, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz** (oral)  
Optical Sensors and Sensing Congress: Fourier Transform Spectroscopy, Jul 2021 (online)
33. *Fourier transform spectroscopy using difference frequency generation comb sources at  $3.3 \mu m$  and  $7.8 \mu m$*   
A. Hjältén, M. Germann, I. Sadiék, C. Lu, F. Senna Vieira, M. Stuhr, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, M. Stuhr, G. Soboń, and **A. Foltynowicz** (oral)  
Optical Sensors and Sensing Congress: Fourier Transform Spectroscopy, Jul 2021 (online)
34. *Sub-Doppler double-resonance spectroscopy of methane using a frequency comb probe*  
V. Silva de Oliveira, I. Silander, A. C. Johansson, O. Axner, **A. Foltynowicz**, L. Rutkowski, G. Soboń, and K. K. Lehmann (oral)  
International Symposium on Molecular Spectroscopy, Jun 2021 (online)
35. *High-resolution comb-based Fourier transform spectroscopy in the  $3.3 \mu m$  and  $7.8 \mu m$  range*  
A. Hjältén, M. Germann, C. Lu, F. Senna Vieira, **A. Foltynowicz**, I. Sadiék, M. Stuhr, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, and G. Soboń (oral)  
International Symposium on Molecular Spectroscopy, Jun 2021 (online)
36. *Frequency comb Fourier transform spectroscopy at  $8 \mu m$  using a compact difference frequency generation source*  
M. Germann, A. Hjältén, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, G. Soboń, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2021 (online)
37. *High-resolution measurements of halogenated volatile organic compounds using frequency comb Fourier transform spectroscopy*  
A. Hjältén, I. Sadiék, C. Lu, F. Senna Vieira, M. Stuhr, M. Germann, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2021 (online)
38. *Double-resonance spectroscopy of methane using a comb probe*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, A. C. Johansson, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2021 (online)
39. *Robust and high-speed cavity-enhanced Vernier spectrometer*

- C. Lu, F. Senna Vieira, A. Głuszek, I. Silander, G. Soboń, and **A. Foltynowicz** (oral)  
CLEO/EU-EQEC, Munich, Germany, Jun 2021 (online)
40. *Precision measurements of  $^{14}\text{N}_2^{16}\text{O}$  using a comb-based Fourier transform spectrometer at  $7.8\ \mu\text{m}$*   
A. Hjältén, M. Germann, K. Krzempek, A. Hudzikowski, A. Głuszek, D. Tomaszewska, G. Soboń, and **A. Foltynowicz** (oral SM1C.4)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2021 (online)
  41. *Optical-optical double-resonance spectroscopy of methane using a cavity-enhanced comb probe*  
V. Silva de Oliveira, I. Silander, L. Rutkowski, G. Soboń, O. Axner, K. K. Lehmann, and **A. Foltynowicz** (oral SM1C.3)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2021 (online)
  42. *Compact  $6.5 - 9\ \mu\text{m}$  frequency comb and its application to Fourier transform spectroscopy*  
K. Krzempek, D. Tomaszewska, A. Głuszek, A. Hudzikowski, T. Martynkien, P. Mergo, J. Sotor, **A. Foltynowicz**, Grzegorz Soboń (oral EM1C.2)  
Optics and Photonics for Sensing the Environment, Jun 2020 (online)
  43. *Continuous-filtering Vernier spectrometer with improved design and performance*  
F. Senna Vieira, C. Lu, I. Silander, A. Głuszek, G. Soboń, and **A. Foltynowicz** (oral LTu3C.5)  
Laser Applications to Chemical, Security and Environmental Analysis, Jun 2020 (online)
  44. *Mid-infrared comb-based Fourier transform spectroscopy of halogenated volatile organic compounds*  
I. Sadiék, A. Hjältén, M. Stuhr, C. Lu, F. Senna Vieira, and A. Foltynowicz (oral SM1M.8)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2020
  45. *Sub-Doppler double-resonance spectroscopy of methane using a frequency comb probe*  
A. Foltynowicz, L. Rutkowski, I. Silander, A. C. Johansson, V. Silva de Oliveira, O. Axner, G. Soboń, T. Martynkien, P. Mergo, and K. K. Lehmann (oral STu4N.1)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2020
  46. *Towards a transferable standard for nitrous oxide isotopomer ratio*  
I. Sadiék, A. Hjältén, M. Stuhr, G. Friedrichs, and A. Foltynowicz (oral STu4N.4)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2020
  47. *Robust, fast and sensitive near-infrared continuous-filtering Vernier spectrometer*  
F. Senna Vieira, C. Lu, I. Silander, A. Głuszek, G. Soboń<sup>2</sup>, and A. Foltynowicz (oral SM1M.5)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2020
  48. *Measurement of high-resolution spectra of HVOCs using comb-based Fourier transform spectroscopy.*  
I. Sadiék, A. Hjältén, and A. Foltynowicz (oral)  
26th Colloquium on High Resolution Molecular Spectroscopy, Dijon, France, Aug 2019
  49. *Cavity-enhanced complex refractive index spectroscopy using an optical frequency comb.*  
A. C. Johansson, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, A. Foltynowicz, L. Rutkowski (poster)  
26th Colloquium on High Resolution Molecular Spectroscopy, Dijon, France, Aug 2019
  50. *Optical frequency comb photoacoustic spectroscopy.*  
I. Sadiék, A. Hjältén, A. Foltynowicz, T. Mikkonen, J. Toivonen, M. Vainio (poster)  
26th Colloquium on High Resolution Molecular Spectroscopy, Dijon, France, Aug 2019
  51. *Sub-Doppler double-resonance spectroscopy of methane using a frequency comb probe.*

- A. Foltynowicz, I. Silander, A. C. Johansson, O. Axner, K. K. Lehmann, L. Rutkowski, G. Soboń, T. Martynkiem, P. Mergo (poster)  
26th Colloquium on High Resolution Molecular Spectroscopy, Dijon, France, Aug 2019
52. *Time-resolved continuous-filtering Vernier spectroscopy in a flame.*  
C. Lu, F. Senna Vieira, F. M. Schmidt, and A. Foltynowicz (oral CH-13.1)  
CLEO/EU-EQEC, Munich, Germany, Jun 2019
53. *Optical frequency comb photoacoustic spectroscopy.*  
I. Sadiiek, T. Mikkonen, M. Vainio, J. Toivonen, and A. Foltynowicz (oral CH-3.4)  
CLEO/EU-EQEC, Munich, Germany, Jun 2019
54. *Precise comb-based Fourier transform spectroscopy for line parameter retrieval.*  
A. C. Johansson, L. Rutkowski, P. Maslowski, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, and A. Foltynowicz (oral ED-4.3)  
CLEO/EU-EQEC, Munich, Germany, Jun 2019
55. *Highly birefringent microstructured silica fibers for broadband soliton self-frequency shift.*  
T. Martynkien, K. Stefańska, F. Senna Vieira, C. Lu, A. Foltynowicz, P. Mergo, J. Sotor, G. Soboń (poster)  
CLEO/EU-EQEC, Munich, Germany, Jun 2019
56. *Comb-based Fourier transform spectroscopy as a platform for measurements of high-resolution spectra of HVOCs.*  
I. Sadiiek, A. Hjältén, and A. Foltynowicz (oral)  
13<sup>th</sup> International Used Meeting on Cavity Enhanced Spectroscopy, Madison, WI, USA, Jun 2019
57. *Optical frequency comb photoacoustic spectroscopy.*  
I. Sadiiek, T. Mikkonen, M. Vainio, J. Toivonen, and A. Foltynowicz (poster)  
13<sup>th</sup> International Used Meeting on Cavity Enhanced Spectroscopy, Madison, WI, USA, Jun 2019
58. *Continuous-filtering Vernier spectroscopy in a flame.*  
F. Senna Vieira, C. Lu, F. M. Schmidt, and A. Foltynowicz (poster)  
13<sup>th</sup> International Used Meeting on Cavity Enhanced Spectroscopy, Madison, WI, USA, Jun 2019
59. *Optical frequency comb photoacoustic spectroscopy.*  
I. Sadiiek, T. Mikkonen, M. Vainio, J. Toivonen, and A. Foltynowicz (oral SW3L.5)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2019
60. *Near-infrared continuous-filtering Vernier spectroscopy in a flame.*  
C. Lu, F. Senna Vieira, F. M. Schmidt, and A. Foltynowicz (oral SM2N.5)  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2019
61. *Broadband calibration-free cavity-enhanced complex refractive index spectroscopy using an optical frequency comb.*  
A. C. Johansson, L. Rutkowski, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, and A. Foltynowicz (oral)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018
62. *CO<sub>2</sub> line parameter retrieval beyond the Voigt profile using comb-based Fourier transform spectroscopy.*  
A. C. Johansson, A. Filipsson, L. Rutkowski, P. Maslowski, and A. Foltynowicz (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018
63. *Optical frequency comb Faraday rotation spectroscopy.*  
A. C. Johansson, J. Westberg, G. Wysocki, and A. Foltynowicz (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018

64. *Optical frequency comb photoacoustic spectroscopy.*  
I. Sadiq, T. Mikkonen, T. Tomberg, F. Senna Vieira, J. Karhu, M. Vainio, J. Toivonen and A. Foltynowicz (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018
65. *Near-infrared continuous-filtering Vernier spectroscopy in a flame.*  
C. Lu, F. Senna Vieira, A. C. Johansson, F. M. Schmidt, and A. Foltynowicz (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018
66. *An experimental water line list at 1950 K in the 1.5-1.6  $\mu\text{m}$  region.*  
L. Rutkowski, A. Foltynowicz, F. M. Schmidt, A. C. Johansson, A. Khodabakhsh, A. A. Kyuberis, N. F. Zobov, O. L. Polyansky, S. N. Yurchenko, and J. Tennyson (poster)  
Field Laser Applications in Industry and Research, Assisi, Italy, Sept 2018
67. *Broadband calibration-free complex refractive index spectroscopy in a cavity using a comb-based Fourier transform spectrometer*  
A. C. Johansson, L. Rutkowski, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, and A. Foltynowicz  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2018
68. *CO<sub>2</sub> line parameter retrieval beyond the Voigt profile using comb-based Fourier transform spectroscopy*  
A. C. Johansson, A. Filipsson, L. Rutkowski, P. Maslowski, and A. Foltynowicz  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, Jun 2018
69. *Broadband complex refractive index spectroscopy via measurement of cavity modes (STu3P.4)*  
A. C. Johansson, L. Rutkowski, A. Filipsson, T. Hausmaninger, G. Zhao, O. Axner, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2018
70. *CO<sub>2</sub> line parameter retrieval beyond the Voigt profile using comb-based Fourier transform spectroscopy (STu3P.6)*  
A. C. Johansson, A. Filipsson, L. Rutkowski, P. Maslowski, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2018
71. *Optical frequency comb Faraday rotation spectroscopy (JW2A.165)*  
A. C. Johansson, J. Westberg, G. Wysocki, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2018
72. *Broadband molecular spectroscopy via probing of cavity modes using a frequency-comb-based Fourier transform spectrometer*  
A. C. Johansson, L. Rutkowski, G. Zhao, T. Hausmaninger, A. Khodabakhsh, A. Filipsson, O. Axner, and A. Foltynowicz  
25<sup>th</sup> Colloquium on High Resolution Molecular Spectroscopy, Helsinki, Finland, Sept 2017
73. *Line parameter retrieval beyond the Voigt profile using comb-based Fourier transform spectroscopy*  
A. Filipsson, A. C. Johansson, L. Rutkowski, P. Maslowski, A. Khodabakhsh, and A. Foltynowicz  
25<sup>th</sup> Colloquium on High Resolution Molecular Spectroscopy, Helsinki, Finland, Sept 2017
74. *Measurement of H<sub>2</sub>O and OH Spectra in an Atmospheric Flame using Optical Frequency Comb Spectroscopy*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, D. M. Valiev, F. M. Schmidt, L. Lodi, O. L. Polyansky, S. Yurchenko, J. Tennyson, and A. Foltynowicz  
25<sup>th</sup> Colloquium on High Resolution Molecular Spectroscopy, Helsinki, Finland, Sept 2017

75. *Broadband precision spectroscopy and multispecies detection using optical frequency combs*  
A. Khodabakhsh, L. Rutkowski, A. C. Johansson, G. Soboń, A. Filipsson, C. Lu, and A. Foltynowicz  
OPTO:2017, Warsaw, Poland, Jul 2017
76. *Broadband and high resolution direct measurement of cavity resonances*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, and A. Foltynowicz  
Conference on Lasers and Electro-Optics – European Quantum Electronics Conference, Munich, Germany, Jun 2017
77. *Cavity-enhanced continuous-filtering Vernier spectroscopy at 3.3  $\mu\text{m}$  using a femtosecond optical parametric oscillator*  
A. Khodabakhsh, L. Rutkowski, J. Morville, A. C. Johansson, G. Sobon, and A. Foltynowicz  
Conference on Lasers and Electro-Optics – European Quantum Electronics Conference, Munich, Germany, Jun 2017
78. *High-power broadband source tunable from 2.8 to 4  $\mu\text{m}$  based on difference frequency generation*  
G. Soboń, T. Martynkien, P. Mergo, M. Marangoni, and A. Foltynowicz  
Conference on Lasers and Electro-Optics – European Quantum Electronics Conference, Munich, Germany, Jun 2017
79. *Detection of OH and H<sub>2</sub>O in an atmospheric flame by near-infrared optical frequency comb spectroscopy*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, D. Valiev, L. Lodi, S. Yurchenko, O. L. Polyansky, J. Tennyson, F. M. Schmidt, and A. Foltynowicz  
Conference on Lasers and Electro-Optics – European Quantum Electronics Conference, Munich, Germany, Jun 2017
80. *Faraday rotation spectroscopy using an optical frequency comb*  
A. C. Johansson, J. Westberg, A. Khodabakhsh, L. Rutkowski, G. Wysocki, and A. Foltynowicz  
Conference on Lasers and Electro-Optics – European Quantum Electronics Conference, Munich, Germany, Jun 2017
81. *Direct broadband measurement of cavity modes using a mechanical Fourier transform spectrometer with kHz resolution*  
L. Rutkowski, A. C. Johansson, G. Zhao, T. Hausmaninger, A. Khodabakhsh, and A. Foltynowicz  
Cavity Enhanced Spectroscopy, Egmont aan Zee, the Netherlands, Jun 2017
82. *Mid-infrared cavity-enhanced continuous-filtering Vernier spectroscopy using a femtosecond optical parametric oscillator*  
A. Khodabakhsh, L. Rutkowski, J. Morville, G. Sobon, C. Lu and A. Foltynowicz  
Cavity Enhanced Spectroscopy, Egmont aan Zee, the Netherlands, Jun 2017
83. *Line parameter retrieval beyond the Voigt profile using comb-based Fourier transform spectroscopy*  
A. C. Johansson, L. Rutkowski, P. Masłowski, A. Filipsson, A. Khodabakhsh, and A. Foltynowicz  
Cavity Enhanced Spectroscopy, Egmont aan Zee, the Netherlands, Jun 2017
84. *Detection of OH in an atmospheric flame using near-infrared cavity-enhanced optical frequency comb spectroscopy*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, D. Valiev, F. M. Schmidt, and A. Foltynowicz

- Cavity Enhanced Spectroscopy, Egmont aan Zee, the Netherlands, Jun 2017
85. *Mechanical Fourier transform spectrometer with kHz resolution (SW4J.6)*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2017
  86. *Continuous-filtering Vernier spectroscopy at 3.3  $\mu\text{m}$  using a femtosecond optical parametric oscillator (SW1L.5)*  
A. Khodabakhsh, L. Rutkowski, J. Morville, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2017
  87. *Near-infrared Fourier transform cavity-enhanced optical frequency comb spectroscopy*  
A. Khodabakhsh, L. Rutkowski, P. Maslowski, F. M. Schmidt, and A. Foltynowicz  
Light, Energy and the Environment Congress: Fourier Transform Spectroscopy (FTS), Leipzig, Germany, Nov 2016
  88. *Fourier transform and Vernier spectroscopy with a mid-Infrared optical frequency comb*  
A. Khodabakhsh, V. Ramaiah-Badarla, L. Rutkowski, A. C. Johansson, K. F. Lee, J. Jiang, C. Mohr, M. E. Fermann, and A. Foltynowicz  
Light, Energy and the Environment Congress: Fourier Transform Spectroscopy (FTS), Leipzig, Germany, Nov 2016
  89. *Fourier-transform-based noise-immune cavity-enhanced optical frequency comb spectroscopy*  
A. C. Johansson, A. Khodabakhsh, L. Rutkowski, and A. Foltynowicz  
Light, Energy and the Environment Congress: Fourier Transform Spectroscopy (FTS), Leipzig, Germany, Nov 2016
  90. *Detection of H<sub>2</sub>O and OH in a flame by optical frequency comb spectroscopy*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, D. M. Valiev, L. Lodi, O. L. Polyansky, S. Yurchenko, J. Tennyson, F. M. Schmidt, and A. Foltynowicz  
Optics and Photonics in Sweden, Linköping, Sweden, Nov 2016
  91. *Fourier Transform spectroscopy and Vernier spectroscopy using a mid-infrared optical frequency comb*  
A. Khodabakhsh, V. Ramaiah-Badarla, L. Rutkowski, A. C. Johansson, K. F. Lee, J. Jiang, C. Mohr, M. E. Fermann, and A. Foltynowicz  
Optics and Photonics in Sweden, Linköping, Sweden, Nov 2016
  92. *Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
A. C. Johansson, A. Khodabakhsh, L. Rutkowski, and A. Foltynowicz  
Optics and Photonics in Sweden, Linköping, Sweden, Nov 2016
  93. *Optical frequency comb Fourier transform spectroscopy with resolution beyond the path difference limit*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, P. Maslowski, G. Kowzan, K. F. Lee, A. Mills, C. Mohr, J. Jiang, M. E. Fermann, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2016
  94. *Fourier-transform-based cavity-enhanced optical frequency comb spectroscopy*  
A. C. Johansson, L. Rutkowski, A. Khodabakhsh, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2016
  95. *Measurement of H<sub>2</sub>O and OH in a flame by optical frequency comb spectroscopy*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, D. M. Valiev, L. Lodi, Z. Qu, R. Ghorbani, O. L. Polyansky, J. Tennyson, F. M. Schmidt, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2016
  96. *Fourier transform spectroscopy and Vernier spectroscopy using an optical frequency comb in the 3-5.4  $\mu\text{m}$  range*

- A. Khodabakhsh, V. Ramaiah-Badarla, L. Rutkowski, A. C. Johansson, K. F. Lee, J. Jiang, C. Mohr, M. E. Fermann, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Aix-les-Bains, France, Sept 2016
97. *Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
A. C. Johansson, L. Rutkowski, A. Khodabakhsh, and A. Foltynowicz  
23rd International Conference on Spectral Line Shapes, Toruń, Poland, Jun 2016
  98. *Optical frequency comb spectroscopy of H<sub>2</sub>O and OH in a flame*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, D. M. Valiev, L. Lodi, Z. Qu, R. Ghorbani, O. L. Polyansky, J. Tennyson, F. M. Schmidt, and A. Foltynowicz  
23rd International Conference on Spectral Line Shapes, Toruń, Poland, Jun 2016
  99. *Optical frequency comb spectroscopy at 3.2-5.4 μm*  
A. Khodabakhsh, V. Ramaiah-Badarla, A. C. Johansson, L. Rutkowski, and A. Foltynowicz  
23rd International Conference on Spectral Line Shapes, Toruń, Poland, Jun 2016
  100. *Optical frequency comb spectroscopy at 3.3 and 5.2 μm by a Tm: fiber-laser-pumped optical parametric oscillator (JF2K.6)*  
A. Khodabakhsh, V. Ramaiah-Badarla, L. Rutkowski, A. C. Johansson, K. F. Lee, J. Jiang, C. Mohr, M. E. Fermann, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, Jun 2016
  101. *Optical frequency comb Fourier transform spectroscopy with resolution beyond the path difference limit (SW4H.1)*  
L. Rutkowski, A. C. Johansson, A. Khodabakhsh, P. Maslowski, G. Kowzan, K. F. Lee, A. Mills, C. Mohr, J. Jiang, M. E. Fermann, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, Jun 2016
  102. *Measurement of H<sub>2</sub>O and OH in a flame by optical frequency comb spectroscopy (SW4H.8)*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, D. Valiev, L. Lodi, Z. Qu, R. Ghorbani, O. Polyanski, Y. Jin, J. Tennyson, F. M. Schmidt and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, Jun 2016
  103. *Fourier transform spectroscopy with resolution beyond the optical path limit*  
P. Maslowski, G. Kowzan, K. F. Lee, M. E. Fermann, A. Foltynowicz, A. C. Johansson, A. Khodabakhsh, and L. Rutkowski  
High Resolution Molecular Spectroscopy, 24th Colloquium, Dijon, France, Aug 2015
  104. *Optical frequency comb Fourier transform spectroscopy with resolution exceeding the limit set by the optical path difference*  
A. Foltynowicz, L. Rutkowski, A. C. Johansson, A. Khodabakhsh, P. Maslowski, G. Kowzan, K. Lee, and M. E. Fermann  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, June 2015
  105. *Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, and A. Foltynowicz  
International Symposium on Molecular Spectroscopy, Champaign-Urbana, IL, June 2015
  106. *Optical frequency comb Fourier transform spectroscopy with resolution beyond the optical path limit*  
A. Foltynowicz, L. Rutkowski, A. C. Johansson, A. Khodabakhsh, P. Maslowski, G. Kowzan, K. Lee, and M. E. Fermann  
Cavity Enhanced Spectroscopy, Boulder, CO, USA, Jun 2015
  107. *Cavity-enhanced optical frequency comb spectroscopy of high-temperature water in a flame*  
A. Khodabakhsh, L. Rutkowski, A. C. Johansson, Y. Jin, Z. Qu, R. Ghorbani, F. M. Schmidt, and A. Foltynowicz

- Cavity Enhanced Spectroscopy, Boulder, CO, USA, Jun 2015
108. *Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
L. Rutkowski, A. Khodabakhsh, A. C. Johansson, and A. Foltynowicz  
Cavity Enhanced Spectroscopy, Boulder, CO, USA, Jun 2015
  109. *Cavity-enhanced optical frequency comb spectroscopy of high-temperature water in a flame (STh4O.2)*  
A. Khodabakhsh, Z. Qu, C. Abd Alrahman, A. C. Johansson, L. Rutkowski, F. M. Schmidt, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, CA, USA, May 2015
  110. *Fourier-transform-based noise-immune cavity-enhanced optical frequency comb spectroscopy (SMIO.6)*  
A. Khodabakhsh, A. C. Johansson, L. Rutkowski, and A. Foltynowicz  
Conference on Lasers and Electro-Optics, San Jose, Ca, USA, May 2015
  111. *Fourier-transform cavity-enhanced optical frequency comb spectroscopy*  
A. Foltynowicz, A. Khodabakhsh, and A. C. Johansson  
2<sup>nd</sup> Stakeholder Workshop on Traceability of Spectral Reference Line Data, Braunschweig, Germany, Oct 2014
  112. *Noise-immune cavity-enhanced optical frequency comb spectroscopy*  
A. Khodabakhsh, C. Abd Alrahman, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Florence, Italy, May 2014
  113. *Cavity-enhanced optical frequency comb spectroscopy of H<sub>2</sub>O and CO<sub>2</sub> in a flame*  
C. Abd Alrahman, A. Khodabakhsh, F. M. Schmidt, Z. Qu, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Florence, Italy, May 2014
  114. *Optical measurement of the gas number density in a Fabry–Perot cavity*  
I. Silander, M. Zelan, O. Axner, F. Arrhén, L. Pendrill, and A. Foltynowicz  
Field Laser Applications in Industry and Research, Florence, Italy, May 2014
  115. *Fourier-transform cavity-enhanced optical frequency comb spectroscopy*  
A. Foltynowicz, C. Abd Alrahman, A. Khodabakhsh  
Cavity Enhanced Spectroscopy, Naples, Italy, Jun 2013
  116. *Cavity-enhanced direct frequency comb spectroscopy in the mid-infrared*  
A. J. Fleisher, B. J. Bjork, K. C. Cossel, A. Foltynowicz, P. Maslowski, and J. Ye  
Gordon Research Conference on Atomic and Molecular Interactions, Easton, MA, USA, Jul 2012
  117. *Developments in cavity-enhanced direct frequency comb spectroscopy*  
B. J. Bjork, A. Foltynowicz, A. J. Fleisher, P. Maslowski, and J. Ye  
43rd Annual DAMOP Meeting, Anaheim, CA, USA, Jun 2012
  118. *Mid-infrared frequency comb spectrometer based on an optical parametric oscillator*  
F. Adler, P. Maslowski, A. Foltynowicz, K. C. Cossel, S. A. Diddams, and J. Ye  
IEEE Photonics Society Summer Topical Meetings, Montreal, QC, Canada, Jul 2011
  119. *Direct frequency comb spectroscopy of molecules in the mid-infrared*  
P. Maslowski, A. Foltynowicz, F. Adler, K. C. Cossel, T. Ban, T. C. Briles, and J. Ye  
Frontiers in Spectroscopy: Faraday Discussion 150, Basel, Switzerland, April 2011
  120. *High-resolution mid-infrared frequency comb Fourier transform spectrometer*  
F. Adler, P. Maslowski, A. Foltynowicz, K. C. Cossel, T. C. Briles, and J. Ye  
Frontiers in Optics, Rochester, NY, USA, Oct 2010
  121. *Broadband direct frequency comb spectroscopy in the mid-IR*

- P. Maslowski, A. Foltynowicz, F. Adler, K. C. Cossel, T. C. Briles, and J. Ye  
21<sup>st</sup> International Conference on High Resolution Spectroscopy, Poznan, Poland, Sept 2010
122. *Applications of cavity-enhanced direct frequency comb spectroscopy*  
A. Foltynowicz, P. Maslowski, F. Adler, K. C. Cossel, T. C. Briles, and J. Ye  
21<sup>st</sup> International Conference on High Resolution Spectroscopy, Poznan, Poland, Sept 2010
123. *Fiber-laser-based NICE-OHMS for trace gas detection*  
A. Foltynowicz, W. Ma, and O. Axner  
Ohio State University International Symposium on Molecular Spectroscopy, Columbus, OH, USA, Jun 2009
124. *Fiber-laser-based NICE-OHMS for ultra-sensitive trace species detection*  
A. Foltynowicz, F. M. Schmidt, W. Ma, and O. Axner  
Laser Applications to Chemical Security, and Environmental Analysis, St. Petersburg, FL, USA, Mar 2008
125. *Fiber-laser-based NICE-OHMS and trace gas detection*  
A. Foltynowicz, F. M. Schmidt, W. Ma, and O. Axner  
Stable Isotope Ratio Infrared Spectrometry, Florence, Italy, Sept 2007
126. *Fiber-laser-based NICE-OHMS and trace gas detection*  
A. Foltynowicz, F. M. Schmidt, W. Ma, and O. Axner  
Field Laser Applications in Industry and Research, Florence, Italy, Sept 2007
127. *A scrutiny of NICE-OHMS for trace species detection*  
A. Foltynowicz, F. M. Schmidt, W. Ma, and O. Axner  
Tunable Diode Laser Spectroscopy, Reims, France, Jul 2007
128. *Fiber-laser-based NICE-OHMS for ultra-sensitive trace species detection*  
F. M. Schmidt, A. Foltynowicz, W. Ma, and O. Axner  
Tunable Diode Laser Spectroscopy, Reims, France, Jul 2007