



Groupe “nanoMIR” / “nanoMIR” group
“Composants à nanostructures pour Moyen Infra-Rouge”
“Nanostructure-based devices for Mid-Infra-Red Applications”

Publication list (2025)

C-INV : Communications invitées / Invited communications (national or international)

1. Fabrication de cellules thermophotovoltaïques à très bas gap

JP Perez, B Roux, M Tornay, P Christol, R Vaillon
Workshop X-PV, janvier 2025

2. Reducing the defect density in the epitaxy of III-Vs on Silicon substrates

Audrey Gilbert, Eric Tournié, Gilles Patriarche, C. Cornet, Michel Ramonda, Laurent Cerutti, Maeva Fagot, Achim Trampert, Karl Graser, Jean-Baptiste Rodriguez
ICG2025 – Italian Crystal Growth Conference, Lecce - Italie, 19-22 January 2025

3. Mid-IR GaSb-based lasers grown on Si platforms

E. Tournié, M. Paparella, A. Remis, D. A. Díaz Thomas, M. Fagot, A. Gilbert, M. Silvestre, L. Cerutti, and J.-B. Rodriguez.
SPIE Photonics West, Opto Symposium, 25 – 31 January 2025, San Francisco (USA), paper 13385-25.

4. Infrared Photonics at nanoMIR & Non-Locality effects in heavily doped semiconductors

T. Taliercio
Institut des Nanosciences de Lyon (Campus de Central-Lyon), 3 April 2025

5. Type-II Interband Cascade Laser Monolithically Integrated on Si Substrate

M. Fagot, D.A. Díaz-Thomas, D. Ayache, Y. Rouillard, A. Vicet, J.-B. Rodriguez, E. Tournié, and L. Cerutti.
Compound Semiconductor Week 2025, 27 – 30 May 2025, Banff (Canada).

6. Plasmonic light-matter interaction for enhanced molecular detection in MIR using metal and semiconductor-based optical sensors

P. Fehlen, M. Najem, L. Cerutti, T. Taliercio and F. Gonzalez-Posada Flores
AES 2025, TANGIER - MOROCCO, JULY 1 – 4, 2025

7. Monolithic Integration of III-Sb lasers on group-IV Substrates

E. Tournié, A. Gilbert, M. Fagot, A. Remis, M. Paparella, L. Monge-Bartolome, K. Kinjalk, A.N. Baranov, L. Cerutti, and J.-B. Rodriguez.

Huawei 2025 European Workshop on Photonics Technologies for Data Centre, 13 June 2025, Cardiff (UK).

8. New antimonide TPV cells

JP Perez, B Roux, M Tornay, P Christol, R Vaillon

Workshop GDR TREE, June 2025

9. Spectroscopie laser photoacoustique pour le diagnostic dans l'air exhalé et la détection de polluants atmosphériques

Vicet A, Seoudi T, Ayache D, Abou Naoum F, Charensol J, Pages, Rosenkantz E, Bahriz M, Gouzi F, GDR Chalcogénures 3-5 juin 2025, Montpellier

10. III-V/Si Heteroepitaxy: Understanding And Mastering Growth Fundamentals.

C. Cornet, S. Pallikkara Chandrasekharan, A. Gilbert, Chen Wei, Federico Panciera, Laurent Travers, Laurent Cerutti, Ludovic Largeau, Tony Rohel, Rozenn Bernard, Gilles Patriarche, Eric Tournié, Nicolas Bertru, Jean-Christophe Harmand, Jean-Baptiste Rodriguez, Laurent Pedesseau.

24th American Conference on Crystal Growth and Epitaxy (ACCGE-24), 13 – 18 July 2025, Stevenson (WA), USA.

11. Active IR and THz Light Modulators Based on Epsilon-Near Zero InAs and GaSb Semiconductor Frequency-Selective Surfaces

J. Guise, F. Gonzalez-Posada Flores, S. Blin, T. Talierno

META 2025, 15th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Malaga, Spain, 22 - 25 July, 2025

12. MBE Growth of Interband Antimonide Lasers on Silicon.

Laurent Cerutti, Maëva Fagot, Daniel Díaz-Thomas, Andres Remis, Audrey Gilbert, Yves Rouillard, Jean-Baptiste Rodriguez, Eric Tournié.

39th North American Conference on Molecular Beam Epitaxy (NAMBE 2025), 25 – 27 August 2025, Albuquerque, NM (USA).

13. Growth and study of Sb based Interband cascade laser on GaSb, GaAs and Si substrates

M. Fagot, D. Diaz-Thomas, J. Goutorbe, Y. Rouillard, J.-B. Rodriguez, E. Tournié, and L. Cerutti,

6th International workshop on opportunities and challenges in mid-infrared laser-based gas sensing (mirs6ens), September 9-11, 2025, Wurtzburg (Germany).

14. Photoacoustics for breath analysis: sources and setups - Preliminary demonstration on cardiovascular diagnosis

Vicet Aurore, Seoudi Tarek, Abou Naoum Fadia, Ayache Diba, Pages Fanny, Rosenkrantz Eric, Gouzi Fares, Bahriz Michael. CPASS 2025, Cagliari (It).

15. Sb-based lasers epitaxially grown on Si(001) for mid-infrared applications

L. Cerutti, D. A. Díaz-Thomas, M. Fagot, A. Gilbert, M. Paparella, A. Remis, A.N. Baranov, Z. Loghmari, Y. Rouillard, J.B. Rodriguez, R. Teissier, and E. Tournié.

IEEE Photonics Conference (IPC 2025), 9-13 November 2025, Singapore.

16. Photoacoustic spectroscopy: basics, sensing developments and applications on breath analysis

Vicet A, Seoudi T, Ayache D, Abou Naoum F, Charensol J, Pages, Rosenkantz E, Baranov A. D. A. Diaz-Thomas, Bahriz M, Gouzi F – *Journées JDR IASIS, 13 nov 2025, Paris*

17. Exploring quantum plasmonics using heavily doped semiconductors

S. Hajji, A. Moreau, P. Loren, L. Cerutti, F. Gonzalez-Posada, T. Talierno

International Applied Physics Meeting (IAP-M), Mohammed VI Polytechnic University (UM6P) in Benguerir, Morocco, from December 1st–5th, 2025.

ACL : Articles dans des revues internationales avec comité de lecture référencées par ISI web / Peer reviewed publications referenced by ISIweb

1. Quantum spin Hall effect in III-V semiconductors at elevated temperatures: advancing topological electronics.

Manuel Meyer, Jonas Baumbach, Sergey Krishtopenko, Adriana Wolf, Monika Emmerling, Sebastian Schmid, Martin Kamp, Benoit Jouault, Jean-Baptiste Rodriguez, Eric Tournié, Tobias Müller, Ronny Thomale, Gérald Bastard, Frédéric Teppe, Fabian Hartmann, Sven Höfling.

Sci. Adv., **11**(43), ead2408 (2025). <https://doi.org/10.1126/sciadv.adz2408>

2. MBE growth of GaSb on Ge-based templates grown on Si for mid-infrared photonics (invited article).

M. Silvestre, S. Lacaze, A. Gilbert, S. Calcaterra, A. De Cerdeira Oliveira, D. Impelluso, G. Isella, J.-B. Rodriguez, and E. Tournié.

Opt. Mat. Express **15**(10), 2499 – 2509 (2025). <https://doi.org/10.1364/OME.569432>

3. High-performance GaSb-based interband cascade lasers emitting at 4.7 μm grown on GaAs and Si substrates

M. Fagot, D. A. Díaz-Thomas, A. Gilbert, M. Ramonda, Y. Rouillard, J. B. Rodriguez, E. Tournié, and L. Cerutti, Optical Materials Express **15** (11) 2654 (2025). <https://doi.org/10.1364/OME.568659>

4. Strain relief and threading dislocation reduction in GaSb/AlSb/GaSb heterostructures grown on Si(001) substrate.

K. Graser, A. Gilbert, J.-B. Rodriguez, E. Tournié, and A. Trampert.

J. Appl. Phys. **137**, 205302 (2025). <https://doi.org/10.1063/5.0268051>.

5. Material parameter models and simulations of III-Sb solar cells based on AlGaAsSb, AlInAsSb and GaInAsSb quaternary alloys.

Stéphanie Parola, Lucas Gavotto, Julie Tournet, Alexandre Vauthelin, Frédéric Martinez, Joanna Kret, Yves Rouillard, Eric Tournié, Yvan Cuminal.

Solar Energy Materials & Solar Cells **288**, 113613 (2025).

<https://doi.org/10.1016/j.solmat.2025.113613>

6. MBE growth and properties of GaInAsSb alloys deep inside the miscibility gap

T. Sabardeil, G. Gregoire, J.-L. Reverchon, V. Trinite, E. Tournié, J.-B. Rodriguez, A. Evirgen.

J. Cryst. Growth **657**, 128107 (2025). <https://doi.org/10.1016/j.jcrysgro.2025.128107>

7. Single mode, distributed feedback interband cascade lasers grown on Si for gas sensing.

D. Andrés Díaz-Thomas, D. Ayache, M. Fagot, Z. Loghmari, A. Gilbert, Y. Rouillard, A. N. Baranov, J.-B. Rodriguez, E. Tournié, A. Vicet, L. Cerutti.

Appl. Phys. Lett. **126** (3), 031102 (2025). <https://doi.org/10.1063/5.0242398>

8. Mid-infrared frequency combs and pulse generation on single section interband cascade laser
P. Abayan, B. Chomet, D.A. Díaz-Thomas, M. Saemian, M. Mičica, J. Mangeney, J. Tignon, A.N. Baranov, K. Pantzas, I. Sagnes, C. Sirtori, L. Cerutti, and S. Dhillon,
Applied Physics Letters, **126**, 131101 (2025). <https://doi.org/10.1063/5.0245050>

9. Multisubband Plasmons in InAs/GaSb Broken Gap Quantum Well
W. J. Pasek, S. Hajji, O. Tata, L. Cerutti, F. Gonzalez-posada Flores, S. Hurand, A. El Fatimy, and T. Taliercio
To be published in Phys. Rev. B (2025)

10. Large-area sensors using Cd(Zn)O plasmonic nanoparticles for surface-enhanced infrared absorption
Ibañez-Romero, Pablo, Martínez Castellano, Eduardo, Yeste, Javier, Gonzalez-Posada, Fernando, Taliercio, Thierry, Muñoz-Sanjosé, Vicente, Montes Bajo, Miguel and Hierro, Adrian
Nanophotonics, 2025. <https://doi.org/10.1515/nanoph-2025-0020>

11. Study of the Sb incorporation in InAs/InAsSb type-II superlattices and its influence on the band-edge profile.
M. Tornay, K. Pantzas, G. Patriarche, J.-P. Perez, L. Rousseaux, Y. Guldner, N. Péré-Laperne, P. Christol
Journal of Applied Physics. **137**, 163103 (2025) doi 10.1063/5.0248470

12. Ga-Free T2SL Infrared Detector Under Proton Irradiations: Identification of Dark Current Regimes.
H. Mezouar; A. Michez; C. Bataillon; M. Tornay; P. Christol
IEEE Transactions on Nuclear Sciences **72**, 2600 (2025) doi 10.1109/TNS.2025.3560789

13. Minority carrier lifetime and operating voltage dependence on the barrier layer thickness in nBn infrared photodetectors
M. Tornay, A. Ramiandrasoa, M. Bouschet, J. P. Perez, J.-L. Reverchon, B. Simozrag, C. Bonvalot, I. Ribet, N. Péré-Laperne, P. Christol
Infrared Physics & Technology **148**, 105846-6 (2025), doi 10.1016/j.infrared.2025.105846

14. Breath Isoprene Sensor Based on Quartz Enhanced Photoacoustic Spectroscopy.
Abou Naoum, F.; Ayache, D.; Seoudi, T.; Diaz-Thomas, D.A.; Baranov, A.; Pages, F.; Charensol, J.; Rosenkrantz, E.; Aouadi, M.; Bahriz, M., Gouzi, F. and Vicet, A.
Sensors 2025, 25, 6732. <https://doi.org/10.3390/s25216732>

15. Characterization of complex stacking of semiconductors through near field imaging and spectroscopy
L. Tailpied, C. Gureghian, F. Fossard, J.-S. Mérot, J.-B. Rodriguez, F. Gonzalez-Posada Flores, G. Vincent, T. Taliercio, Baptiste Fix
Advanced Materials, e07645, (2025). <https://doi.org/10.1002/adma.202507645>

C-COM : Communications orales sans actes dans un congrès international ou national / Oral communications without proceedings at international or national conferences.

1. Development and Optimization of Photo-Acoustic sensors based on multi-pass QEPAS for medical applications – CPASS 2025, Cagliari.
Fadia Abou Naoum, Fanny Pagès, Michael Bahriz, Aurore Vicet -

2. **New capacitive MEMS design for photoacoustic gas sensing**
Fanny Pages, Julien Charensol, Julie Goutorbe, Tarek Seoudi, Diba Ayache, Eric Rosenkrantz, Aurore Vicet, Michael Bahriz– CPASS 2025, Cagliari.
3. **New capacitive MEMS design for photoacoustic gas sensing**
Fanny Pages, Julien Charensol, Julie Goutorbe, Tarek Seoudi, Diba Ayache, Eric Rosenkrantz, Aurore Vicet, Michael Bahriz -, JNOG 2025, Sète
4. **Dark current simulation and understanding of proton-irradiated midwave infrared T2SL barrier photodetectors**
H. Mezouar*, A. Michez, M. Tornay, P. Christol
3rd Infrared detection for space applications workshop (IRSA 2025), Toulouse, June 2025
5. **Prospects on interface properties for optimizing the performance of InAs/InAsSb T2SL infrared detectors**
M. Tornay*, J. P. Perez, K. Pantzas, G. Patriarche, L. Rousseaux, Y. Guldner, N. Péré-Laperne, P. Christol
Infrared Colloquium, Freiburg, March 2025
6. **Interband cascade lasers emitting below 3 μm grown on GaAs substrate**
M. Fagot, D. Díaz-Thomas, Y. Rouillard, J.-B. Rodriguez, E. Tournié, and L. Cerutti,
22nd Euro-MBE, 9-13 March 2025, Auron Ski Resort (France), Paper S04.
7. **Micro-transfer-printing integration of Interband cascade lasers on SiGe**
Y. Billiet, H. Ren, C. Chevalier, X. Letartre, J.L. Leclercq, P. Cremilieu, R. Mazurczyck, M. Perestujuk, L. Ferhat, C. Grilliet, M. Fagot, E. Tournié, B. Ben Bakir, R. Armand, V. Reboud, L. Cerutti, and C. Seassal,
Optica Advanced Photonics Congress, July 13-17, 2025, Marseille (France), session ITh3B
8. **Mid-Infrared frequency combs and pulse generation on single interband cascade lasers**
P. Abayan, B. Chomet, D.A. Diaz-Thomas, M. Saemian, M. Micica, J. Mangeney, J. Tignon, A. Baranov, K. Pantzas, I. Sagnes, C. Sirtori, L. Cerutti, and S. Dhillon,
Infrared and terahertz Quantum Workshop (ITQW2025), 1-5 September, 2025, Saint Malo (France)
9. **Sb-based interband cascade lasers with emission wavelengths below 3 μm grown on GaSb**
M. Fagot, D.A. Diaz-Thomas, Y. Rouillard, J.-B. Rodriguez, E. Tournié, and L. Cerutti,
XVII Mid-Infrared Optoelectronics Materials and devices (MIOMD), July 13-16, 2025, Wien (Austria), Paper 4 – Session 8
10. **Sb-based Interband Cascade Lasers emitting below 3 μm grown on GaSb and GaAs substrates**
M. Fagot, D. Diaz-Thomas, J. Goutorbe, Y. Rouillard, J.-B. Rodriguez, E. Tournié, and L. Cerutti,
6th International workshop on opportunities and challenges in mid-infrared laser-based gas sensing (mirs6ens), September 9-11, 2025, Wurtzburg (Germany).
11. **Regular Pulse Packages in an Interband Cascade Laser directly grown on Si**
H. Kim, T. Poletti, M. Fagot, D.A. Diaz-Thomas, L. Cerutti, and F. Grillot, XVII Mid-Infrared Optoelectronics Materials and devices (MIOMD), July 13-16, 2025, Wien (Austria), Paper 1 – Session 1.
12. **Recent advances on mid-infrared interband cascades lasers with external optical feedback**

T. Poletti, H. Kim, D.A. Díaz-Thomas, M. Fagot, A.N. Baranov, L. Cerutti, and F. Grillot, SPIE Photonics West, Opto-2025, "Quantum Sensing and nano Electronics and Photonics XXII", 25-30 January –2025, San Francisco (USA), paper 13376-54 <https://doi.org/10.1117/12.3042145>

13. Impact of Hole Traps on the Dark Current of Proton Irradiated Ga-Free T2SL Infrared Detector

H. Mezouar*, A. Michez, M. Tornay, P. Christol

European Conference on Radiation and its Effects on Components and Systems (RADECS 2025), Antwerp, september 2025

C-AFF : Communications par affiche dans un congrès international ou national / Poster at international or national conferences.

1. Estimating the Second Viscosity of Electron Gas through the Excitation of Bulk Plasmon Resonances

Moreau, E. Sakat, J.-P. Hugonin, T. Mottin, A. Costard, D. Langevin, P. Loren, L. Cerutti, F. Gonzalez-Posada, T. Taliercio

Nanophotonics and Micro/Nano Optics International Conference, Oct. 20-22, 2025, Sorbonne Université, Paris, France

2. Multisubband Plasmons in InAs/GaSb Broken Gap Well

W. J. Pasek, S. Hajji, O. Tata, L. Cerutti, F. G.-P. Flores, S. Hurand, A. El Fatimy, T. Taliercio

The Infrared and Terahertz Quantum Workshop (ITQW), 1-5 September 2025, Saint-Malo, France

3. Strong Near-field Enhancement Through Sphp And Lsp Coupling On Cdo Gratings

P. Ibáñez Romero, M. Villanueva Blanco, E. Martinez Castellano, J. Yeste, F. Gonzalez-Posada, V. Muñoz-Sanjosé, T. Taliercio, M. Montes Bajo, A. Hierro

META 2025, 15th International Conference on Metamaterials, Photonic Crystals and Plasmonics, Malaga, Spain, 22 - 25 July, 2025

4. Experimental and semiclassical description of multisubband plasmons in InAs/GaSb quantum wells

S. Hajji, W. Julian Pasek, S. Hurand, L. Cerutti, F. Gonzalez-Posada, T. Taliercio

Mid-IR Optoelectronics: Materials and Devices XVII, July 13-16 2025, Vienna, Austria.

5. Intégration d'un modulateur THz commandé optiquement en guides d'onde anti-résonants à cœur creux

J. Guise, G. Humbert, T. Taliercio, S. Blin

Journées Nationale de l'Optique Guidée, Sète, 07-10 juillet 2025

6. Material characterization by infrared ellipsometry for design of mid-infrared interband cascade lasers

J. Goutorbe, M. Fagot, T. Taliercio, Y. Rouillard, L. Cerutti

Journées Nationale de l'Optique Guidée, Sète, 07-10 juillet 2025

7. Single mode interband cascade laser emitting at 4.6 μm

L. Kacel, Z. Loghmari, M. Fagot, D.A. Diaz Thomas, R. Teissier and L. Cerutti

Journée Nationale de l'optique Guidée, Papier P1B5, Sète, 07-10 July 2025.

8. Study of chalcogenide waveguide for optical coupling with III-V devices on Silicon

S. Boulos, R.K. Kribich, R. Escalier, C. Vigreux, L. Cerutti, E. Tournié, and J.-B. Rodriguez

Journée Nationale de l'optique Guidée, Papier P1B5, Sète, 07-10 July 2025

9. Quantum Plasmons In InAs / GaSb Broken Gap Quantum Well

S. Hajji, W. J. Pasek, S. Hurand, L. Cerutti, F. Gonzalez-Posada, T. Taliercio

The 11th International Conference on Surface Plasmon Photonics, May 19-23, 2025, Tokyo, Japan

Books

Fabrication and characterization of Ga-free T2SL structure for high performance midwave infrared photodetector

J.-P. Perez, M. Tornay, N. Péré-Laperne, P. Christol

Chapter in "Recent Developments in Type-II Superlattice Infrared Detectors" of Semiconductor & Semimetal series, Volume **118**, Elsevier (2025). doi.org/10.1016/bs.semsem.2025.04.004