MINISTERIO DE CIENCIA E INNOVACIÓN

CURRICULUM VITAE (maximum 4 pages)

AGENCIA ESTATAL DE INVESTIGACIÓN

Part A. PERSONAL INFORMATION

CV date	28/07/2023

First and Family name	Adrian Hierro Cano		
Social Security, Passport, ID number		Age	
Researcher codes	Open Researcher and Contributor ID (ORCID**)	0000-0002-0414-4920	
	SCOPUS Author ID (*)	55911821400	
	WoS Researcher ID (*)		

(*) Optional
(**) Mandatory

A.1. Current position

Name of University/Institution	Universidad Politécnica de Madrid		
Department	Instituto de Sistemas Optoelectrónicos y Microtecnología		
Address and Country	Avda. Complutense 30, 28040 Madrid, Spain		
Phone number	910672213	E-mail	adrian.hierro@upm.es
Current position	Full Professor	From	03/05/2019
Key words	Plasmonics, metamaterials, photodetectors, optoelectronics, oxides, arsenides, laser diodes		

A.2. Education

PhD, Licensed, Graduate	University	Year
Ph.D. Electrical Engineering	Ohio State University, USA	16/03/2001
M.Sc. Electrical Engineering	Ohio State University, USA	20/03/1998
B.Sc. Physics	Universidad Autónoma de Madrid, Spain	17/08/1994

A.3. General indicators of quality of scientific production *(see instructions)*

- PhD Advisor of 7 finished Thesis.
- JCR publications in Q1>75.
- Google Scholar indicators: Number of citations=2192; 156 citations/year in last 5 years; h-index=25; i10-index=63 (number of publications with more than 10 citations).
- Scopus indicators: h-index=22; Number of citations=1733.

Part B. CV SUMMARY *(max. 3500 characters, including spaces)*

Adrian Hierro has a degree in Physics from Universidad Autónoma de Madrid, and MSc and PhD degrees in Electrical Engineering from The Ohio State University (USA). In 2002 he joined the Institute for Optoelectronic Systems and Microtechnology (ISOM) from the Technical University of Madrid (UPM) with a Ramón y Cajal Researcher position. In 2019 he became Full Professor at the Department of Electronic Engineering at UPM. From 2019 he has been the Director of ISOM.

For the past 10 years he has been active in IR optoelectronic components, including light emitting diodes (LEDs) and laser diodes (LD) for 1.3-1.5 μm emission, and GaInNAs/GaAs quantum well photodetectors in the near IR. More recently he has worked on InAs/GaAsSbN-based quantum dot structures, both for light emitters and intersubband IR photodetectors, and on thin layers of GaAsSbN/GaAs for IR photodetection and photovoltaic applications. He started the Oxide Group at ISOM, dedicated to oxide-based optoelectronics using ZnMgCdO alloys in the UV and VIS, paying special attention to the development of Schottky photodetectors, and more recently, to IR-THz quantum well intersubband photodetectors (QWIPs), quantum cascade lasers (QCLs), and IR plasmonics and metamaterials.

He has contributed as a researcher to 16 research projects (6 of them international), and has also been PI of 6 national projects (in three of them also coordinator), he has been PI of a bilateral project with Japan (MINECO-JST bilateral program), scientific-technical manager of a

European FP6 FET project, and PI of a EC FET-H2020 project (Zinc Oxide For TeraHertz Cascade Devices - www.zoterac.eu).

He has received 3 pre-doctoral research awards, as well as the "Research and Technological Development Award for Young Professors" (2006), and the "Award for the Best International Project" (2019), both from UPM. He has supervised 6 finished PhD theses, which have led to 4 awards at conferences, and a doctorate award ("Premio Extraordinario"). He is the author/co-author of more than 130 publications, of more than 120 contributions to international conferences, he has presented 15 invited talks, contributed to the organization of 4 conferences, is a member of the Program Committee of SPIE Photonics West since 2016, and evaluator of ANEP, European Research Council (ERC), Polish Science National Center, and French Agence Nationale de la Recherche (ANR), as well as of numerous high impact journals.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications *(see instructions)*

- M. Montes Bajo, J-M. Chauveau, A. Vasanelli, A. Delteil, Y. Todorov, C. Sirtori, A. Hierro, "Perspectives and opportunities with multisubband plasmonics", J. Appl. Physics 134, 010901, 2023, *Perspectives Invited, Featured Article*.
- Pengfei Guo, Hongfu Zhu, Wenhao Zhao, Chen Liu, Liguo Zhu, Qian Ye, Ning Jia, Hongyue Wang, Xiuhai Zhang, Wanxia Huang, Vladimir A Vinokurov, Evgenii Ivanov, Dmitry Shchukin, Daniel Harvey, Jose María Ulloa, **Adrian Hierro**, Hongqiang Wang, " Interfacial Embedding of Laser-Manufactured Fluorinated Gold Clusters Enabling Stable Perovskite Solar Cells with Efficiency Over 24%", Advanced Materials 33, 2101590, 2021.
- Eduardo Martínez Castellano, Julen Tamayo-Arriola, Miguel Montes Bajo, Alicia Gonzalo, Lazar Stanojević, Jose María Ulloa, Oleksii Klymov, Javier Yeste, Said Agouram, Elías Muñoz, Vicente Muñoz-Sanjosé, **Adrian Hierro**, " Self-assembled metal-oxide nanoparticles on GaAs: infrared absorption enabled by localized surface plasmons", Nanophotonics 10, 2509, 2021.
- Bo Meng, Borislav Hinkov, Nolwenn Marie L Biavan, Hanh T Hoang, Denis Lefebvre, Maxime Hugues, David Stark, Martin Franckié, Almudena Torres-Pardo, Julen Tamayo-Arriola, Miguel M Bajo, **Adrian Hierro**, Gottfried Strasser, Jérôme Faist, Jean M Chauveau , "Terahertz Intersubband Electroluminescence from Nonpolar m-Plane ZnO Quantum Cascade Structures", ACS Photonics 8, 343, 2020.
- J. Tamayo-Arriola, E. Martínez Castellano, M. Montes Bajo, A. Huerta-Barberà, E. Muñoz, V. Muñoz-Sanjosé, **A. Hierro**, "Controllable and Highly Propagative Hybrid Surface Plasmon-Phonon Polariton in a CdZnO-based Two-Interface System", ACS Photonics 6, 2816, 2019.
- **A. Hierro**, M. Montes Bajo, M. Ferraro, J. Tamayo-Arriola, N. Le Biavan, M. Hugues, J. M. Ulloa, M. Giudici, J.M. Chauveau, and P. Genevet, "Optical Phase Transition in Semiconductor Quantum Metamaterials", Phys.Rev.Lett. 123, 117401, 2019.
- B. Meng, J. Tamayo-Arriola, N. Le Biavan, M. Montes Bajo, A. Torres-Pardo, M. Hugues, D. Lefebvre, **A. Hierro**, J.M. Chauveau, J. Faist, "Observation of Intersubband Absorption in Coupled Quantum Wells", Phys.Rev.Appl. 5, 054007, 2019.
- A. Gonzalo, L. Stanojević, A. D. Utrilla, D. F. Reyes, V. Braza, D. Fuertes Marrón, T. Ben, D. González., **A. Hierro**, A. Guzman, J. M. Ulloa, "Open circuit voltage recovery in GaAsSbN-based solar cells: Role of deep Nrelated radiative states", Solar Energy Materials and Solar Cells 200, 109949, 2019.
- M. Montes Bajo, J. Tamayo-Arriola, N. Le Biavan, J. M. Ulloa, D. Lefebvre, M. Hugues, J. M. Chauveau, **A. Hierro**, " Breaking the intersubband selection rules for absorption

with ZnO quantum wells: light polarization sensitivity under normal incidence", Phys.Rev.Appl. 10, 034022, 2018.

- M. Montes Bajo, J. Tamayo-Arriola, M. Hugues, J. M. Ulloa, N. Le Biavan, R. Peretti, F. H. Julien, J. Faist, J. M. Chauveau, **A. Hierro**, "Multisubband plasmons in doped ZnO quantum Wells", Phys.Rev.Appl 10, 024005, 2018, *Selected by the editor.*

C.2. Research projects

International last 10 years:

- *Zinc Oxide For TeraHertz Cascade Devices (ZOTERAC),* Proposal Number: 665107. Agency: European Commission FET-H2020, Participants: Universidad Politécnica de Madrid, ETHZurich (Swirzerland), CNRS-CRHEA (France), Tech.Univ.Wien (Austria), Univ. Paris Sud (France). Duration: 4.5 years, 01/09/2015-01/03/2020. **PI: Adrian Hierro**.
- *ZnMgO-based Nanocolumnar and core-shell LEDs with high power efficiencies*-PIB2010JP-00279; Agencies: Ministerio de Ciencia e Innovación y Japan Science and Technology Agency; Participants: Universida Politecnica de Madrid, University of Shizuoka (Japan); Duration: 12/2010-12/2013; **PI: Adrian Hierro**.

National last 10 years:

- *Optica Planar Con Metamateriales Basados En Oxidos - PID2020-114796RB-C2*, Agency: MICIN. Participants: Universidad Politécnica de Madrid and Universidad de Valencia. Duration: 01/09/2021-01/09/2024. **PI and Coordinator: Adrian Hierro.**
- *Plasmónica basada en óxidos para fotodetectores de IR* – TEC2017-85912-C2-1-R, Agency: MINECO. Participants: Universidad Politécnica de Madrid and Universidad de Valencia. Duration: 01/01/2018-01/09/2021. **PI and Coordinator: Adrian Hierro.**
- *Ingeniería de bandas con nuevas estructuras de semiconductores II-VI para optoelectronica avanzada de VIS-IR* – TEC2014-60173-C2-2. Agency: MINECO. Participants: Universidad Politécnica de Madrid and Universidad de Valencia. Duration: 01/01/2015-01/01/2018. **PI: Adrian Hierro.**
- *Oxide-based UV photonics*–TEC2011-28076-C02-01; Agency: Ministerio de Ciencia e Innovación; Participants: Universida Politecnica de Madrid, Universidad de Valencia; Duration: 01/2012-01/2015**PI and Coordinador: Adrian Hierro**.
- *ZnO-based nano- and microdevices for H_2 and UV detection*–TEC2008-04718/TEC; Agency: Ministerio de Ciencia e Innovación; Partiipants: Universida Politecnica de Madrid; Duration: 01/2009-01/2012; **PI: Adrian Hierro**.

C.3. Contracts, technological or transfer merits

- *Laterally biased Quantum IR detectors* - Award FA8655-12-1-3006; Agency: Air Force Research Laboratory (AFRL, USA); Duration: 10/2011-10/2013; PI: Alvaro de Guzmán Fernández (Adrian Hierro researcher).
- *MBE Regrowth of laterally-biased double quantum well tunable detector*, Award FA8655-09-1-3047; Agency: Air Force Research Laboratory (AFRL, USA); Participants: Universidad Politécnica de Madrid; Duration: 02/2009-02/2010; PI: Alvaro de Guzmán Fernández (Adrian Hierro researcher).

C.4 Awards

Research Awards last 10 years:

- "Award for the best international project", Universidad Politécnica de Madrid, 2019.

- The article Montes Bajo et al., Phys. Rev. Appl. 10, 024005 (2018) featured as **Editor's Suggestion** in Phys. Rev. Appl. Only 13% of the published papers made it to the category.
- "Premio a la labor desarrollada en Investigación o Desarrollo Tecnológico por profesores menores de treinta y cinco años", Fundación General de la Universidad Politécnica de Madrid, 2006.

C.5. Management Positions

- Director: *Instituto de Sistemas Optoelectrónicos y Microtecnología*, Universidad Politécnica de Madrid, 05/07/2019 - to date.
- Secretario académico del *Instituto de Sistemas Optoelectrónicos y Microtecnología*, 20/10/2005 hasta 23/06/2008, Universidad Politécnica de Madrid.

C.6. Reviewer Activities

- Evaluator for *European Research Council (ERC),* Seventh European Frame-program FP7, *Ideas Program*, 2011.
- Evaluator for *Agencia Nacional de Evaluación y Prospectiva (ANEP)*, Área de Tecnología Electrónica y de las Comunicaciones, 2006, 2008, 2010, 2015, 2016, 2018, 2019.
- Evaluator for *French Agence Nationale de la Recherche* (*ANR*): 2020, 2021.
- Evaluator for *Polish National Science Center*: 2021.
- Reviewer for Journals: Light Science & Applications, Acta Materialia, ACS Applied Nano Materials, Nanotechnology, IEEE Electron Device Letters, IEEE Photonics Technology Letters, IEEE Journal of Quantum Electronics, Applied Surface Science, Journal of Applied Physics, Applied Physics Letters, Journal of Crystal Growth, Superlattices and Microstuctures, Sensors and Actuators A: Physical, Journal of Electronic Materials.

C.7. Committee Membership

<u>Organizing Committee Member</u>:

- *Workshop on Frontier Photonic and Electronic Materials and Devices, German-Japanese-Spanish Joint Workshop*, Granada, 16-18/03/2011.

<u>Program Committee Member:</u>

- *European Semiconductor Laser Workshop (EWSL),* 2015.
- *SPIE Photonics West* (San Francisco, USA), 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023.