CURRICULUM VITAE (CVA)

Part A. PERSONAL INFORMATION

First name	Javier		
Family name	Martín Sánchez		

A.1. Current position

Position	Profesor Titular de Universidad	
Initial date	11.12.2024	
Institution	Universidad de Oviedo	
Department/Center	Physics	
Country	Spain	
Key words	Nanophotonic, quantum emitters, polaritons, micro-photoluminescence, near-field optical microscopy, 2D materials	

A.2. Previous positions (research activity interuptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
11.12.2024 - present	Profesor Titular de Universidad / Universidad de Oviedo / Spain
01.02.2020 – 10.12.2024	Excellence Grant “Ramón y Cajal” Senior researcher / Universidad de Oviedo / Spain
15.07.2017 – 01.02.2020	Excellence Grant “Clarín” Senior researcher / Universidad de Oviedo / Spain
15.03.2013 – 31.07.2017	Postdoctoral researcher / Johannes Kepler University Linz/ Austria
01.01.2012 – 14.03.2017	Postdoctoral researcher / Instituto de Óptica-CSIC / Spain
01.01.2010 – 31.12.2011	Postdoctoral researcher / Universidade do Minho / Portugal
01.10.2009 – 31.12.2009	Postdoctoral researcher / Paul-Drude-Institut / Germany
01.06.2004 – 01.06.2009	Predoctoral researcher / IMM-CSIC / Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Doctorate in Physics	Universidad Autónoma de Madrid / Spain	2009
Degree in Physics	Universidad de Extremadura / Spain	2001

Part B. CV SUMMARY *(max. 5000 characters, including spaces)*

Since 2024 I hold an Associate Professor position at the University of Oviedo where I am performing research and giving lectures on Optics, Quantum Physics, Advanced Materials and Master’s courses in Materials Science. My research activities and expertise are focused on the control of the optical emission properties of quantum emitters and routing of light at the nanoscale in 2D materials by employing a variety of strategies both in the near-field and far-field. During my career I have published 65 scientific publications in peer-reviewed journals of high visibility, 1 book chapter and 1 invited review publication. I have presented more than 100 presentations at international conferences and 20 invited seminars (13 invited talks in conferences). Among all my scientific results in the last 10 years, I would like to highlight those related to the unprecedented active manipulation of the optical properties of semiconductor III-V nanostructures by employing strain fields during my postdoctoral stay at the JKU (Austria). In these works, I designed, fabricated and characterized hybrid semiconductor-piezoelectric devices allowing to have a full control of the in-plane stress field in semiconductor nanomembranes [Physical Review Letters 2015, Advanced Optical Materials 2016, ACS Photonics 2017]. This pioneering achievement allowed for the first time the production of entangled photons in polarization from self-assembled III-V QDs with controlled emission energy [Nature Commun. 2016, Physical Review Letters 2018], as well as flips the quantization axis in self-assembled QDs [Nature Commun. 2018]. In 2016, I extended my studies by starting as main responsible a new research field in the optical investigation of quantum emitters in 2D materials and the strain effects on their optical properties at JKU (Austria). Since 2017 (as principal investigator thanks to an excellence grant “Clarín”), additionally, I started as Principal Investigator to investigate the near-field optical

properties in 2D materials at the University of Oviedo where I have just setup a completely new laboratory to perform leading quantum optics studies on 2D materials by micro-photoluminescence. As a landmark towards the realization of planar on-chip optical circuits at the nanoscale, we discovered the highly anisotropic in-plane propagation of polaritons in MoO3 and V2O5 crystals [Nature 2018, Nature Materials 2020]. As a natural step forward, we are performing fundamental studies to understand the propagation of polaritons in these highly anisotropic 2D materials [Advanced Materials 2020, Nature Communications 2021], as well as investigating different strategies to control the light propagation in these materials [Science Advances 2021a, Science Advances 2021b, Nature Materials 2023]. Recently, we realized active tuning of quantum emitters in 2D materials by employing hybrid 2D-piezoelectric devices and developing strategies to preserve their optical quality [Adv. Opt. Mater. 2016, Nano Letters 2019, Nano Research 2018, Nature Materials 2023 (under review)].

I have a consolidated international network of specialized collaborators. I have recently obtained (as principal investigator at the University of Oviedo) a competitive EU QuantERA joint project. In addition, I have been selected as panel member of the committee for the QuantERA 2023 call (a leading European network for excellent Research and Innovation in Quantum Technologies).

I have obtained self-funding through 4 postdoctoral grants (FCT Portuguese grant, JAE-DOC, "Programa Clarín" and "Ramón y Cajal") (+1 I3P predoctoral fellowship) in competitive regime. I have participated in 18 (10 international) research projects, including 2 ERC starting grants, 1 FET-OPEN project and 6 projects as principal investigator (2 prestigious grants, 3 national project and 1 EU project).

I have co-supervised (or supervised) 6 PhD students (4 PhD in realization and the 2 completed PhD students are now working as scientific researchers at UAM (Spain) and Univ. Geneve (Switzerland)), 2 PhD students' short stays, 9 Master students (1 in realization), 22 Bachelor students (3 in realization), 5 external practices in the lab. I have successfully obtained funding for: 1) 2 young researchers through the program JAE-INTRO from CSIC (together with the candidate's CV, one of them is currently doing her PhD under my supervision); 2) 2 PhD students (together with the candidates' CV) through competitive calls (Severo Ochoa predoctoral program). I am registered in the Spanish National Research Agency (AEI), the National Science Center (Poland) and the German Deutsche Forschungsgemeinschaft (DFG) databases as an expert evaluator for national projects/calls. I am Editor in the Nature family journal "Communications Materials" (https://acortar.link/6ZTnpG), a member of the advisory panel of the Institute of Physics (IOP – Nanotechnology journal) and I am in the editorial board of "quantum optics – frontiers in photonics". I have collaborated referee in peer-reviewed journals of high visibility such as Nature, Science and ACS family journals. I have been selected as panel member of the committee for the evaluation of "Ramón y Cajal" 2023 prestigious grants. I have obtained the I3 and R3 certificates (research excellence).

I have participated in outreach activities such as press releases, interviews on the radio, participation in "pint of science" as speaker and co-organizer in the 2022 edition and 1 informative article in the journal Laser Focus. I have established a contract as principal investigator with the private company Activa Biotech, S.L. to perform research on the detection of tumoral tissues by employing optical nanoatennas to transfer our research activities to society.

Part C. RELEVANT MERITS

C.1. Publications

1.- J. Martín-Sánchez, J. Duan, J. Taboada-Gutiérrez, …, and Pablo Alonso-González. Focusing of in-plane hyperbolic polaritons in van der Waals crystals with tailored infrared nanoantennas. **Science Advances** 7 (41) (2021). **AC:** Pablo Alonso-González and **Javier Martín-Sánchez**. **POS:** 1/12. DOI: 10.1126/sciadv.abj0127

2.- J. Duan, G. Álvarez-Pérez, K. V. Voronin, …, and Pablo Alonso-González. Enabling propagation of anisotropic polaritons along forbidden directions via a topological transition. **Science Advances** 7(14) (2021). **AC:** Pablo Alonso-González, Alexey Yu Nikitin and **Javier Martín-Sánchez**. **POS:** (7/9) DOI: 10.1126/sciadv.abf2690

3.- Javier Taboada-Gutiérrez, Gonzalo Álvarez-Pérez, Jiahua Duan, …, and Pablo Alonso-González. Broad Spectral Tuning of Ultra-Low Loss Polaritons in a van der Waals Crystal by Intercalation. **Nature Materials** 19 (9), 964-968 (2020). **AC:** Pablo Alonso-González and **Javier Martín-Sánchez**. **POS:** (19/20) DOI: 10.1038/s41563-020-0665-0

4.- Weiliang Ma, Pablo Alonso-González, Shaojuan Li, …, and Qiaoliang Bao. In-plane anisotropic and ultra-low-loss polaritons in a natural van der Waals crystal. **Nature** 562-7728, 557 (2018). **AC:** Pablo Alonso-González, Rainer Hillenbrand and Qiaoliang Bao.**POS:** (6/18) DOI: 10.1038/s41586-018-0618-9
5.- Oliver Iff*, Davide Tedeschi*, **Javier Martín-Sánchez*(co-author)**, …, and Christian Schneider. Strain-Tunable Single Photon Sources in WSe_2 Monolayers. **Nano Letters** 19, 6931-6936 (2019). **AC: Javier Martín Sánchez**, Rinaldo Trotta and Christian Schneider. **POS:** (1/13) DOI: 10.1021/acs.nanolett.9b02221
6.- **Javier Martín-Sánchez**, Antonio Mariscal, Marta De Luca, …, and Armando Rastelli. Effects of dielectric stoichiometry on the photoluminescence properties of encapsulated WSe 2 monolayers. **Nano Research** 11, 1399-1414 (2018). **AC: Javier Martín Sánchez**, Rinaldo Trotta. **POS:** (1/11) DOI: 10.1007/s12274-017-1755-4
7.- Rinaldo Trotta, **Javier Martín-Sánchez**, Johannes S Wildmann, et al. 2016 Wavelength-tunable sources of entangled photons interfaced with atomic vapours. **Nature Communications** 7, 1-7. **AC:** Rinaldo Trotta. Posición autor: (2/10) DOI: 10.1038/ncomms10375
8.- **J. Martín-Sánchez**, R. Trotta, G. Piredda, …, and A. Rastelli. Reversible Control of In-Plane Elastic Stress Tensor in Nanomembranes. **Advanced Optical Materials** 4, 682-687 (2016). **AC: Javier Martín Sánchez** and Armando Rastelli. **POS:** (1/13) DOI: 10.1002/adom.201500779
9.- R. Trotta, **J. Martín-Sánchez**, I. Daruka, C. Ortix, and A. Rastelli. Energy-tunable sources of entangled photons: A viable concept for solid-state-based quantum relays. **Physical Review Letters** 114, 150502 (2015). **AC:** Rinaldo Trotta and Carmine Ortix. **POS:** (2/5). DOI: 10.1103/PhysRevLett.114.150502
10.- J. Martín-Sánchez, G. Muñoz-Matutano, J. Herranz, …, and F. Briones. Single Photon Emission from Site-Controlled InAs Quantum Dots Grown on GaAs(001) Patterned Substrates. **ACS Nano** 3, 1513-1517 (2009). **AC: J. Martín-Sánchez**. **POS:** (1/11). DOI 10.1021/nn9001566

C.2. Congress.

1. Javier Martín-Sánchez "Nanophotonics in Nanomaterials" Dornbirn (Austria), Conference "6th Erwin Schrödinger Symposium 2023 & 4th European Conference on Physical Chemistry". Date: 10.10.2023 **(INVITED TALK)**
2. Javier Martín-Sánchez "Strain Tuning of Quantum Emitters in 2D Materials by Strain Fields" Lisbon (Portugal), Conference "NANOPLASMETA 2023". Date: 16.02.2023 **(INVITED TALK)**
3. Javier Martín-Sánchez "Elastic Strain Engineering of Nanomaterials" Besançon (France), Conference "Euromech colloquium 636 : Modulation of physico-chemical processes by elastic strain engineering". Date: 22.05.2023 **(INVITED TALK)**
4. Javier Martín-Sánchez "Focusing of In-plane Hyperbolic Polaritons in Van der Waals Crystals with Tailored Infrared Nanoantennas" Vienna (Austria), Conference "10th International Conference on Photonics, Optics and Laser Technology (PHOTOPTICS 2022)". Date: 11.02.2022 **(INVITED TALK)**
5. Javier Martín-Sánchez "Nanooptics in hyperbolic Van der Waals materials" Universidad de Varsovia (Polonia), Conference "11th International Conference on Metamaterials, Photonic Crystals and Plasmonics META2021". Date: 20.07.2021 **(INVITED TALK)**
6. Javier Martín-Sánchez "Near-field studies in hyperbolic Van der Waals materials" Universidad La Sapienza Roma (Italia), Conference "2Day". Date: 17.06.2021 **(INVITED TALK)**
7. Javier Martín-Sánchez "Strain-tunable optical emission from site-controlled quantum emitters" Viena (Austria), Conference "9th International Conference PHOTOPTICS 2021". Date: 11.02.2021 **(INVITED TALK)**
8. Javier Martín-Sánchez "Nanooptics in hyperbolic Van der Waals materials" Universidad de Varsovia (Polonia), Conference "11th International Conference on Metamaterials, Photonic Crystals and Plasmonics META2021". Date: 20.07.2021 **(INVITED TALK)**
9. Javier Martín-Sánchez, "Strain tuning of quantum light in 2D materials" Conference "2D Materials" Sochi (Russia). Date: 30.10.2019 **(INVITED TALK)**
10. J. Martín-Sánchez, "Full Control of In-Plane Stress Tensor in Nanomembranes" Conference "Mauterndorf International Winterschool 2016" Mauterndorf (Austria). Date: 10.03.2016 **(INVITED TALK)**

C.3. Research projects.

1.- NANO2DSTRAIN, Nanofotónica Activa Mediante Ingeniería de Deformación Elástica en Materiales 2D. 01.09.2024 – 31.12.2027. Agencia Estatal de Investigación (PID2023-148457NB-I00). Research center: Universidad de Oviedo. 187.750 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
2.- ASQUANTECH, Desarrollo de Tecnologías Fotónicas Cuánticas Activas y Escalables en Materiales 2D a Temperatura Ambiente. 01.04.2025 – 01.04.2027. Agencia Estatal de Investigación (CNS2024-154342). Research center: Universidad de Oviedo. 196.988 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
3.- EQUAISE, Enabling QUAntum Information by Scalability of Engineered quantum materials (EU QuantERA). 01.06.2022 – 01.06.2025. Co-fund by EU + Agencia Estatal de Investigación (MCINN-22-PCI2022-132953). Research center: Universidad de Oviedo. 174.800 € (total: 3 M€). **Principal Investigator: Dr. Javier Martín Sánchez.** Coordinator: Prof. Antonio Polimeni (Universita La Sapienza Roma, Italia).
4.- QUAN2DLIGHT, Fuentes de luz cuántica sintonizables en materiales 2D de Van der Waals para fotónica cuántica. 01.06.2020 – 01.06.2023. Agencia Estatal de Investigación (PID2019-110308GA-I00). Research center: Universidad de Oviedo. 81.312 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
5.- Development of strain-tunable photonic devices for quantum information and communication technologies. "Ramón y Cajal" grant. 01.02.2020 – 31.01.2025. Agencia Estatal de Investigación and FSE (RYC2018-026196-I). Research center: Universidad de Oviedo. 308.600 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
6.- Ayudas para grupos de investigación de organismos del principado de Asturias durante el periodo 2021-2023. 01.01.2021 – 31.12.2023. FICYT (SV-PA-21-AYUD/2021/51185). Research Center: Universidad de Oviedo. 220.000 €. Principal Investigator: Prof. María Vélez. **My role: "investigator in the research team".**
7.- 2DNANOPTICA, Nano-optics on flatland: from quantum nanotechnology to nano-biophotonics. 01.01.2017 – 31.12.2021. ERC Starting Grant EU. Research center: Universidad de Oviedo. 1.459.218 €. PI: Dr. Pablo Alonso González. **My role was "postdoc".**
8.- Emisores de luz cuántica sintonizables en energía en materiales bidimensionales. Banco Santander. 01.01.2019 – 21.12.2019. Research center: Universidad de Oviedo. 6.000 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
9.- Strain Effects on 2D Materials: Optics at the Nanoscale. Marie Curie COFUND Action (Programa "Clarín" postdoctoral grant). 15.01.2018 – 15.01.2020. FICYT. Research center: Universidad de Oviedo. 199.771 €. **Principal Investigator: Dr. Javier Martín Sánchez.**
10.- Entanglement distribution via Semiconductor-Piezoelectric Quantum-Dot Relays (SPQRel). ERC Starting Grant. 01.01.2016 – 31.12.2020. Research center: Johannes Kepler University Linz. 1.5 M€. PI: Dr. Rinaldo Trotta. **Role: "postdoc".**
11.- HANAS FP7-ICT-2011-9 Grant Agreement No. 601126 210 (EU FET-OPEN). 01.02.2013 – 01.03.2016. Research center: Johannes Kepler University Linz. 475.754 € (total: 3.244.910 €). PI: Prof. Armando Rastelli. **Role: "postdoc".** Coordinator: Prof. Val Zwiller

C.4. Contracts, technological or transfer merits.

1.- Project prototype promotion PRIZE (ref. 1308457): Dreidimensionaler piezoelektrischer Verspannungsaktuator (Three-dimensional piezoelectric strain actuator – proof of concept) funded by AWS Austria Wirtschaftsservice. Research center: Johannes Kepler University Linz. 14.03.2013 – 29.02.2016. 150.000 €. PI: Prof. Armando Rastelli. **Role:"investigator".**
2.- Research contract. "Detection of Tumor Biomarkers Using FTIR Technique" with the private company "Activa Biotech, S.L.". Research center: Universidad de Oviedo. 10.06.2023 – 10.12.2023. **Principal Investigator: Dr. Javier Martín Sánchez.**