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Decreto Rettore Università di Roma “La Sapienza” n 2267/2021 del 09-08-2021

Curriculum Vitae Ai fini della pubblicazione

Place Roma (Italy)

Date 29-09-2021

Part I – General Information

<i>Full Name</i>	
<i>Date of Birth</i>	
<i>Place of Birth</i>	
<i>Citizenship</i>	
<i>Permanent Address</i>	
<i>Mobile Phone Number</i>	
<i>E-mail</i>	
<i>Spoken Languages</i>	

Part II – Education

Type	Year	Institution	Notes
University graduation	12-2008	Università di Roma La Sapienza	Laurea Triennale in Fisica 110/110
University graduation	07-2011	Università di Roma La Sapienza	Laurea Specialistica in Fisica 110/110
PhD	22-01-2016	Kavli institute of nanoscience, Delft University of Technology	Thesis: <i>OPE3: a model system for single-molecule studies.</i> Supervisor: Prof. Dr. Herre S. J. van der Zant PhD con equipollenza concessa in data 10-10-2019 con numero di protocollo 0001912

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
4-2016	8-2016	IMDEA Nanociencia, Madrid, Spain	Researcher
8-2016	8-2018	IMDEA Nanociencia, Madrid, Spain	Researcher (Rubicon fellow)

8-2018	3-2019	Instituto de Ciencia de Materiales de Madrid (CSIC), Madrid, Spain	Researcher
3-2019	9-2021	Instituto de Ciencia de Materiales de Madrid (CSIC), Madrid, Spain	Researcher (Juan de la Cierva Formacion fellow)
9-2021	Present	Instituto de Ciencia de Materiales de Madrid (CSIC), Madrid, Spain	Researcher
9-2019	9-2025	Abilitazione Scientifica Nazionale	Abilitato a professore di II fascia, categoria 02/B1

IIIB – Temporary Visiting Positions

Start	End	Institution	Position
7-9-2019	17-9-2019	Invited by: Prof. Tao Wang, School of Material Science and Engineering, Northwestern Polytechnical University, Xi'an, China	Visiting researcher
10-6-2019	13-6-2019	Invited by: Prof. Antonio Cassinese, Università Federico II, Napoli, Ita	Visiting researcher
1-3-2010	21-3-2010	ESRF (European Synchrotron Research Facility), France	Synchrotron user
1-4-2010	15-4-2010	ELETTRA (Italian Synchrotron Facility), Italy, CIPO beamline	Synchrotron user
1-9-2009	7-9-2009	ELETTRA (Italian Synchrotron Facility), Italy, ALOISA beamline	Synchrotron user

IIIC – Editorial Appointments

Start	End	Journal/Editor	Position
2020	Present	Nanomaterials MDPI	Topic editor
2020	2020	Nanomaterials MDPI	Guest editor, Special issue on '2D Materials and Their Heterostructures and Superlattices'

IIID – Scientific Evaluator and Refereeing

Date	Institution/Editor	Position
Present	Nature Electronics, Nature Communications, Advanced Materials, Scientific Reports, Material Research Express, Nanotechnology, Crystals, 2D Materials, ACS Nano, ACS Applied Materials & Interfaces, Nanomaterials, Applied Sciences	Scientific referee
2020	DFG (German Research Foundation) Research Proposals Priority Programme SPP 2244, 2D Materials - Physics of van der Waals heterostructures (2DMP)	Expert evaluator
2018	Poland National Science Centre Research Proposals SONATA BIS 8	Expert evaluator
2018	French Ministry of Education and Researches Research Proposals LabEx NIE 2018	Expert evaluator

IIIE – Conferences organization

<i>Date</i>	Insitution/Editor	Position
2020	International conference Flatlands 2020 (postponed to 2022 due to COVID19), Lanzarote, Spain	Organizing committee
2019	International workshop CA2D 2019, 4–5 November 2019, Napoli, Italy	Organizing committee

IIIF – Invited Talks

<i>Date</i>	Title	Conference
5-11-2019	The role of traps in the photocurrent generation mechanism in thin InSe photodetectors	CA2D 2019, Napoli, Italy
7-6-2019	Mechanisms of photoconductivity in atomically thin InSe and GaSe	Nano-M&D 2019, Paestum, Italy
31-8-2017	Bandgap tuning of single-layer transition metal dichalcogenides under biaxial strain	ICNN 3, Quito, Ecuador

IIIG – Scientific presentations

<i>Date</i>	Title	Conference
19-10-2020	Revisiting the Buckling Metrology Method to Determine the Young's Modulus of 2D Materials (Plenary talk)	Graphene 2020, Grenoble, France
26-6-2019	Mechanisms of photoconductivity in atomically thin InSe and GaSe	Graphene 2019, Roma, Italy
27-6-2018	Tunable photodetectors via in situ thermal conversion of TiS ₃ to TiO ₂	Graphene 2018, Dresden, Germany
15-2-2018	Molecular functionalization of single-layer MoS ₂	OPON 2018, Munster, Germany
10-8-2017	Bandgap tuning of single-layer transition metal dichalcogenides under biaxial strain	SPIE 2017, San Diego, USA
11-5-2017	Bandgap strain of single-layer transition metal dichalcogenides	ESMOLNA 2017, El Escorial, Spain
26-1-2017	Bandgap tuning of single-layer transition metal dichalcogenides under biaxial strain	Nanodevices based on graphene and 2D materials, Salamanca, Spain,
21-10-2016	Toward adaptive optics with single layer transition metal dichalcogenides	European Conference on Nanofilms ECNF 2016, Bilbao, Spain

IIII – Invited Seminars and Lectures

Date	Title	Institution
24-2-2020	Optoelectronics devices based on two-dimensional materials	ICMM-CSIC, Madrid, Spain
9/16-9-2019	Series of 5 lectures on “2D materials for optoelectronics and 2D photodetectors”	School of Material Science and Engineering, Northwestern Polytechnical University, Xi’an, China
24-6-2019	Optoelectronics devices based on two-dimensional materials	Physics Department, Università La Sapienza, Roma, Italy
11-5-2018	Atomically thin p-n junctions	Physics Department, Università Federico II, Napoli, Italy
14-12-2017	Atomically thin p-n junctions	ICMM-CSIC, Madrid, Spain
14-1-2016	OPE3: a fruit fly for molecular transport studies	Delft University of Technology, Delft, The Netherlands
9-10-2015	OPE3: a fruit fly for molecular transport studies	IMDEA Nanociencia, Madrid, Spain
23-3-2015	Transition from coherent transport to Coulomb blockade	Copenhagen University, Copenhagen, Denmark
4-3-2015	Electrical and mechanical properties of single-molecule junctions	Physics Department, Università Federico II, Napoli, Italy

Part IV – Teaching experience

IVA – Courses

Year	Institution	Lecture/Course
2020	Instituto de Ciencia de Materiales de Madrid (CSIC)	Lecturer at “Curso de fronteras del conocimiento”, 4 hours
2019	School of Material Science and Engineering, NWPU, Xi’an, China	Series of five lectures “2D Materials for optoelectronics and 2D photodetectors”, 5 hours
2019	Universidad Complutense, Madrid, Spain	Materiales Electronicos course for the degree “Ingenieria de Materiales”, lecture “Introduction to 2D materials”, 2 hours
2012-2014	Delft University of Technology, Delft, the Netherlands	Teaching assistant, Electronic Instrumentation course for Applied Physics (TN2211)

IVB – Supervision of PhD students

Year	Student	Title and institution
2019- <i>Present</i>	Wenliang Zhang (PhD, co-supervision)	In course, UAM, Spain
2018- <i>Present</i>	Felix Carrasco Plana (PhD, co- supervision)	In course, UAM, Spain

2017-2020	Qinghua Zhao (PhD, co-supervision)	<i>Two-dimensional III-VIA semiconductors and their applications in optoelectronic devices, UAM, Spain</i>
2016-2020	Patricia Gant Pinar (PhD, co-supervision)	<i>Straintronic photodetectors based on 2D materials, UAM, Spain</i>

IVC – Supervision of MSc students

Year	Student	Title and institution
2021	Roberto Sanchez (final MSc project)	<i>Electronica de van der Waals en papel, ICMM-CSIC</i>
2020	Francisco Javier Canillas Rodríguez (final MSc project)	<i>Ingenieria de deformacion en materiales bidimensionales, ICMM-CSIC</i>
2019	Marco Alfonso Lombana Rodriguez (final MSc project)	<i>Fotoresponsividad de MoS2 multicapa en los espectros visible e infrarrojo, ICMM-CSIC</i>
2019	Luis Vaquero-Garzon (final MSc project)	<i>Materiales bidimensionales para optoelectrónica en el IR, ICMM-CSIC</i>
2018	Nestor Iguñiz Mitxelena (final MSc project)	<i>Revisiting the Buckling Metrology Method to Determine the Young's Modulus of 2D Materials, ICMM-CSIC</i>
2017	David Barcons (final MSc project)	<i>Control eléctrico de las propiedades ópticas de MoS2, IMDEA Nanociencia</i>

IVD – PhD Defense Committee

Year	Institution	Role
2021	Ph.D. defence of Michael Seitz, Universidad Autonoma de Madrid, Spain	Committee member (Reserve)
2020	Ph.D. defence of Dr. David Maeso, Universidad Autonoma de Madrid, Spain	Committee member (Reserve)
2020	Ph.D. defence of Dr. Yansheng Li, IMDEA Nanociencia, Madrid, Spain	Committee member
2019	Ph.D. defence of Dr. Nikolaos Papadopolous, Delft University of Technology (TU Delft), Delft, Netherlands	Committee member
2016	D. defence of Dr. Jorge Quereda, Universidad Autonoma de Madrid, Spain	Committee member

Part V - Society memberships, Awards and Honors

Year	Title
2018	Juan de la Cierva-Formación Grant, Ministerio de Economía, Industria y Competitividad, 50000 Eur for 24 months, 12 proposal granted on 31 applications
2018	Travel Award for Postdocs, Applied Sciences – MDPI, 800 Swiss Francs
2017	Seal of Excellence - Marie Sklodowska-Curie actions, European Commission

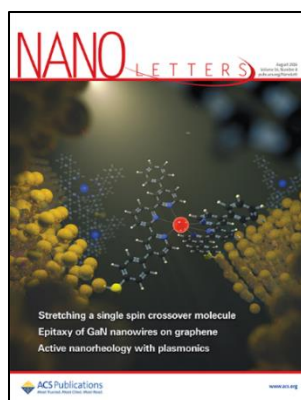
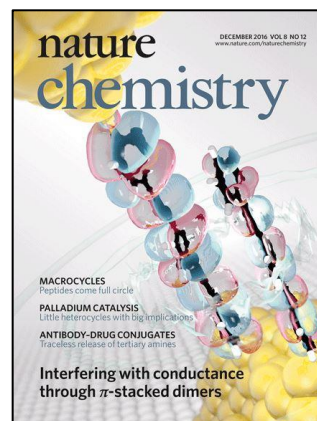
Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program/Grant	Notes
2021 (PI)	Metal-semiconductor Schottky and Ohmic contacts in van der Waals materials (MESSO) Passed the first evaluation step, final interview planned 12-10-2021	ERC Starting Grant, European Commission	(1500000 Eur) Requested funds
2021 (PI)	Unveiling the Nature And Role of DEfects in 2D semiconducting devices (UNARDE-2D)	Convocatoria 2020 - «Proyectos de I+D+i», Spain Ministry of Science	80000 Eur
2021 (PI)	Schottky diodes based on 2D semiconductors	DAAD RISE Worldwide scholarship, German Academic Exchange Service DAAD	8 weeks stay for 1 BSc student
2020 (PI)	Schottky diodes based on 2D semiconductors	DAAD RISE Worldwide scholarship, German Academic Exchange Service DAAD	8 weeks stay for 1 BSc student
2016 (PI)	Molecular functionalization of two-dimensional materials for novel optoelectronics devices	Rubicon Grant, Netherlands Organisation for Scientific Research (NWO),	129996 Eur (of which 5520 Eur for research)
2018 (I)	2D TOPSENSE (Grant agreement ID: 755655)	ERC Starting Grant, European Commission	Main PI Dr. Andrés Castellanos Gomez, ICMM
2013 (I)	Mols@Mols (Grant agreement ID: 321033)	ERC Advanced Grant, European Commission	Main PI Prof. Herre van der Zant, TU Delft

Part VII – Research Activities

Keyword	Description
<i>Molecular Electronics, Quantum transport</i>	<p>After the final graduation in La Sapienza university (laurea specialistica, 110/110) with an experimental MSc thesis in the field of supramolecular surface science under the supervision of Prof. Maria Grazia Betti [1], the candidate was hired in November 2011 for a PhD position at the Technical University of Delft. The candidate earned his PhD title in 2016 under the supervision of Prof. Herre van der Zant with a thesis about electrical transport through single-molecules contacted by movable nano-electrodes. During his PhD the candidate published more than 15 articles on important scientific journals such as Nature Chemistry, Nano Letters or Accounts of Chemical Research, of which more than half as first author.</p> <p>Among the major scientific achievements from this period there is the identification of OPE3 as a fruit fly system for single-molecule electronics, as can be seen by the different articles published by the candidate on this</p>

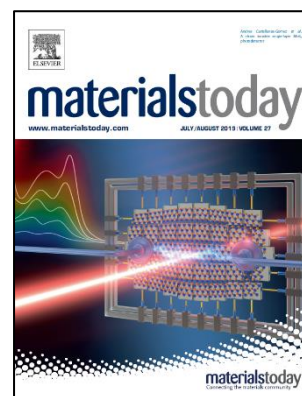
topic [4, 9, 11, 13, 16, 17, 34]. In particular, article [34], published in the prestigious journal *Accounts of Chemical Research*, gives a general overview of OPE3 focusing on the achievements of the candidate in his thesis work and has already been cited more than 30 times. Another important achievement of this period is the experimental demonstration of space-dependent quantum interference effects in π -stacked dimers made of two identical conjugated molecules. This work was published in *Nature Chemistry* and gained the front cover of the journal (see image on the right). Also, a second important contribution during the PhD of the candidate was the demonstration of Kondo effect in the transport through a stable radical molecule, which opened the route of the electrical detection of magnetic correlation effects in radical molecules [8], work published in *Nano Letters*. A final important contribution was the electrical detection of a spin crossover transition in a single-molecule junction. These works, made in a close collaboration with the Marcel Mayor chemistry group in Basel University, have been published in *Angewandte Chemie* and *Nano Letters* (this last article also was selected for the cover of *Nano Letters*, see image on the left) [12, 15].



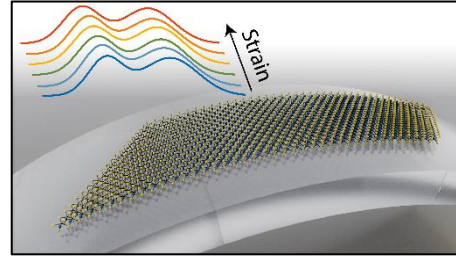
*2D materials,
Optoelectronics,
Strain Engineering*

After earning his PhD, the candidate moved as a postdoc to the laboratory of Dr. Andres Castellanos-Gomez in IMDEA Nanoscience and later in the Instituto de Ciencia de Materiales de Madrid (ICMM) belonging to CSIC the Spanish Research Council. To finance his stay in Castellanos-Gomez laboratory, the candidate gained two competitive grants and fellowships, the Rubicon grant from NWO (2016-2018) and a Juan de la Cierva Formacion (2019-2021). Also, in 2020 the candidate won a permanent position as Científico Titular (permanent researcher) in ICMM.

During his stay in IMDEA Nanociencia and ICMM the candidate published more than 55 articles on prestigious scientific journals such as *Chemical Society Reviews*, *Advanced Materials*, *Materials Today* among others (see figure on the right). In these years, the candidate moved the topic of his research to the field of 2D materials, with a special focus on

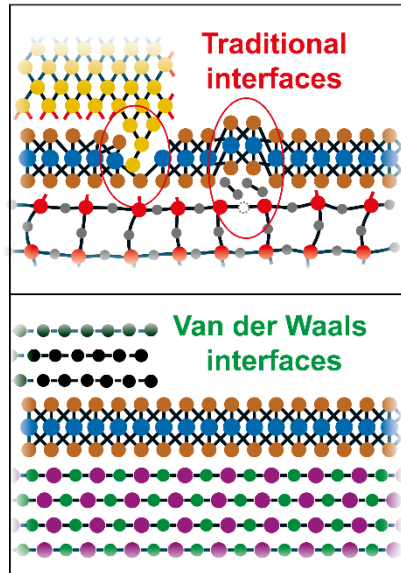


optoelectronics devices based on 2D materials, the effects of strain and mechanical deformations in 2D materials and lately on the physics of 2D metal-2D semiconductor interfaces. Among the major scientific achievements there are several works on strain engineering



of 2D semiconductors and the effects of deformations on the bandgap and excitonic properties of these materials and on the performances of 2D devices [21, 38, 39, 41, 45, 48, 50, 56, 59-61, 68-70], (see figure on the top-right). One important aspect of part of this work was the development of techniques and setups to apply controlled uniaxial or biaxial deformations in these materials, published in various works [21, 38, 59, 60], which were then replicated in various laboratories around the world.

A second important research activity of the candidate has been the study of optoelectronic devices based on 2D semiconductors and van der Waals heterostructures [18, 19, 25, 26, 28, 32, 37, 54, 66, 67]. This research field paved the way for the current main research activity of the candidate,



which is focused on the study of 2D metal-2D semiconductor interfaces and their role in the transport properties of 2D optoelectronic and electronic devices (see figure on the left). This line of research, whose activities began in 2019, was planned and led completely by the candidate as can be seen by the last authorship in the two publications [49, 52] (with two more articles are currently under submission). Especially article [49] generated a large interest in the 2D materials community as shown by the large number of citations, which gained the publication the appearance in the exclusive list “*ESI Highly Cited Papers list of 2020*”.

Also, one project in this same topic has been financed by the Spain Ministry of Science, in the funding program “Convocatoria 2020 - «Proyectos de I+D+i»”. The financed project “Unveiling the Nature And Role of Defects in 2D Semiconducting Devices”, sees the candidate as only PI and was awarded 80000 Eur for a total of 3 years. Similarly, the proposed project “Metal-semiconductor Schottky and Ohmic contacts in van der Waals materials”, an ERC Starting grant where the candidate is the only PI, recently passed to the second and final evaluation step with the interview planned for the 12-10-2021. The requested funding is 1500000 Eur. Finally, another important scientific activity of the candidate has been the writing of various reviews in the field of 2D materials, both

	<p>as first author [29, 30] and in collaboration with other important scientists in the field of 2D materials [35, 63]. These reviews already gathered more than 550 citations in 3 years, highlighting the large impact within the field. A final important research activity of the candidate to highlight is the setting up of setups and laboratories both in IMDEA Nanociencia and in ICMC. In the first institute the candidate helped with the development of a micro-reflectance and micro-transmittance setup and of a scanning-photocurrent microscope to spatially resolve the photocurrent generation in planar devices, setups described and published in the works [20, 24]. Similarly, in ICMC the candidate developed different setups and was one of the major contributors in setting-up the 2D Foundry laboratory in the same institute. In 2018, Dr. Andres Castellanos-Gomez won a ERC Starting Grant, whose money have been dedicated to the setting-up of the 2D Foundry laboratory. In this context, the candidate built or set-up 3 micro-reflectance and micro-transmittance setups, 3 deterministic transfer setups [51], 1 gloveless glove-box working under inert atmosphere [53], 3 high-vacuum probe-stations with optical access [57], 1 commercial closed-cycle cryogenic probe-station (Lakeshore), 1 scanning-photocurrent microscope coupled to a liquid nitrogen cryostat, 1 commercial maskless UV lithography system (Microlight3D) with a chemical bench for sample preparation.</p>
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Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	69	Scopus	2010	2021
Books [scientific]	1	Scopus	2019	2021

Total Impact factor	827 (11.6 IF/Publication)
Total Citations	2297 (Scopus)
Average Citations per Product	33.3 (Scopus)
Hirsch (H) index	26 (Scopus)
Normalized H index*	2.4 (Scopus)

*H index divided by the academic seniority.

Invited oral contributions	3
Total oral contributions	11
Invited scientific seminars and lectures	9

Part IX– Selected Publications

(citations source: Scopus)

[12] **InSe Schottky diodes based on van der Waals contacts**

Q. Zhao, W. Jie, T. Wang, A. Castellanos-Gomez, R. Frisenda
Advanced Functional Materials, **30**, p. 2001307 (2020)

Journal IF 19, citations 15 (8 citations/year)

[11] **Symmetry breakdown in franeite: spontaneous strain, rippling, and interlayer Moiré**

R. Frisenda, G. Sanchez-Santolino, N. Papadopoulos, J. Urban, M. Baranowski, A. Surrente, D. K. Maude, M. Garcia-Hernandez, H. S. J. van der Zant, P. Plochocka, P. San-Jose, A. Castellanos-Gomez
Nano letters, **20**, p. 1141 (2020)

Journal IF 11, citations 9 (5 citations/year)

[10] **The role of traps in the photocurrent generation mechanism in thin InSe photodetectors**

Q. Zhao, W. Wang, F. Carrascoso-Plana, W. Jie, T. Wang, A. Castellanos-Gomez, R. Frisenda
Materialz Horizons, **7**, p. 252 (2020)

Journal IF 12, citations 47 (24 citations/year)

Listed in the ESI Highly Cited Papers list of 2020

[9] **A strain tunable single-layer MoS₂ photodetector**

P. Gant, P. Huang, D. Perez de Lara, D. Guo, R. Frisenda, A. Castellanos-Gomez
Materials Today, **27**, p. 8 (2019)

Journal IF 31, citations 59 (20 citations/year)

Selected for the journal cover

[8] **Robotic assembly of artificial nanomaterials**

R. Frisenda, A. Castellanos-Gomez
Nature Nanotechnology, **13**, p. 441 (2018)

Journal IF 39, citations 6 (2 citations/year)

[7] **Atomically thin p–n junctions based on two-dimensional materials**

R. Frisenda, A. J. Molina-Mendoza, T. Mueller, A. Castellanos-Gomez, H. S. J. Van Der Zant
Chemical Society Reviews, **47**, p. 3339 (2018)

Journal IF 55, citations 130 (32 citations/year)

[6] **Recent progress in the assembly of nanodevices and van der Waals heterostructures by deterministic placement of 2D materials**

R. Frisenda, E. Navarro-Moratalla, P. Gant, D. Pérez De Lara, P. Jarillo-Herrero, R. V. Gorbachev, A. Castellanos-Gomez
Chemical Society Reviews, **47**, p. 53 (2018)

Journal IF 55, citations 237 (60 citations/year)

Selected for the journal cover

[5] **Biaxial strain tuning of the optical properties of single-layer transition metal dichalcogenides**

R. Frisenda, M. Drüppel, R. Schmidt, S. Michaelis de Vasconcellos, D. Perez de Lara, R. Bratschitsch, M. Rohlfing, A. Castellanos-Gomez
npj 2D Materials and Applications, **1**, 10 (2017)

Journal IF 11, citations 94 (20 citations/year)

[4] **Quantum Transport through a Single Conjugated Rigid Molecule, a Mechanical Break Junction Study**

R. Frisenda, D. Stefani, H. S. J. van der Zant
Accounts of Chemical Research, **51**, 1359 (2018)

Journal IF 22, citations 28 (9.3 citations/year)

[3] **Mechanically Controlled Quantum Interference in Individual π -stacked Dimers**

R. Frisenda, V. Jansen, F. C Grozema, H. S. J. van der Zant, N. Renaud
Nature Chemistry, **8**, p. 1099 (2016)

Journal IF 22, citations 104 (17 citations/year)

Selected for the journal cover

[2] **Stretching-induced conductance increase in a spin-crossover molecule**

R. Frisenda, G. D. Harzmann, J. A. Celis Gil, J. M. Thijssen, M. Mayor, H. S. J. Van Der Zant
Nano letters, **18**, p. 4733 (2016)

Journal IF 11, citations 53 (8.8 citations/year)

Selected for the journal cover

[1] **Kondo effect in a neutral and stable all organic radical single molecule break junction**

R. Frisenda, R. Gaudenzi, C. Franco, M. Mas-Torrent, C. Rovira, J. Veciana, I. Alcon, S. T. Bromley, E. Burzurí, H. S. J. Van der Zant
Nano letters, **15**, p. 3109 (2015)

Journal IF 11, citations 68 (9.7 citations/year)

Part X– List of all the Publications

[72] W Zhang, Q Zhao, S Puebla, T Wang, R Frisenda, A Castellanos-Gomez

Optical microscopy-based thickness estimation in thin GaSe flakes, Materials Today Advances, 2021

[71] W Zhang, Q Zhao, C Munuera, M Lee, E Flores, JEF Rodrigues, JR Ares, C Sanchez, J

Gainza, HSJ van der Zant, JA Alonso, IJ Ferrer, T Wang, R Frisenda, A Castellanos-Gomez,
Integrating van der Waals materials on paper substrates for electrical and optical applications,
Applied Materials Today, **23**, 101012, 2021

[70] F Carrascoso, H Li, R Frisenda, A Castellanos-Gomez,

Strain engineering in single-, bi- and tri-layer MoS₂, MoSe₂, WS₂ and WSe₂, Nano Research, **14**, 1698, 2021

[69] S Puebla, R D'Agosta, G Sanchez-Santolino, R Frisenda, C Munuera, A Castellanos-Gomez,

In-plane anisotropic optical and mechanical properties of two-dimensional MoO₃, npj 2D Materials and Applications, **5**, 1, 2021

[68] F Carrascoso, R Frisenda, A Castellanos-Gomez,

Biaxial versus uniaxial strain tuning of single-layer MoS₂, Nano Materials Science, 2021

- [67] S Hu, J Xu, Q Zhao, X Luo, X Zhang, T Wang, W Jie, Y Cheng, R Frisenda, A Castellanos-Gomez, X Gan, *Gate-Switchable Photovoltaic Effect in BP/MoTe₂ van der Waals Heterojunctions for Self-Driven Logic Optoelectronics*, *Advanced Optical Materials*, **9**, 2001802, 2021
- [66] M Ramos, F Carrascoso, R Frisenda, P Gant, S Mañas-Valero, DL Esteras, JJ Baldoví, E Coronado, A Castellanos-Gomez, MR Calvo, *Ultra-broad spectral photo-response in FePS₃ air-stable devices*, *npj 2D Materials and Applications*, **5**, 1, 2021
- [65] M Lee, A Mazaheri, HSJ van der Zant, R Frisenda, A Castellanos-Gomez, *Drawing WS₂ thermal sensors on paper substrates*, *Nanoscale*, **12**, 22091, 2021
- [64] J Azpeitia, R Frisenda, M Lee, D Bouwmeester, W Zhang, F Mompean, HSJ van der Zant, M García-Hernández, A Castellanos-Gomez, *Drawing WS₂ thermal sensors on paper substrates*, *Materials Advances*, **2**, 3274, 2021
- [63] A Chaves, JG Azadani, H Alsalman, D Rabelo da Costa, R Frisenda, AJ Chaves, SH Song, YD Kim, D He, J Zhou, A Castellanos-Gomez, FM Peeters, Z Liu, CL Hinkle, S-H Oh, D Ye Peide, SJ Koester, YH Lee, P Avouris, X Wang, T Low, *Bandgap engineering of two-dimensional semiconductor materials*, *npj 2D Materials and Applications*, **4**, 1, 2020
- [62] R Frisenda, Y Niu, P Gant, M Munoz, A Castellanos-Gomez, *Naturally occurring van der Waals materials*, *npj 2D Materials and Applications*, **4**, 1, 2020
- [61] Q Zhao, T Wang, R Frisenda, A Castellanos-Gomez, *Giant Piezoresistive Effect and Strong Bandgap Tunability in Ultrathin InSe upon Biaxial Strain*, *Advanced Science*, **7**, 2001645, 2020
- [60] F Carrascoso, H Li, R Frisenda, A Castellanos-Gomez, *Strain engineering in single-, bi- and tri-layer MoS₂, MoSe₂, WS₂ and WSe₂*, *Nano Research*, **14**, 1698, 2020
- [59] YK Ryu, F Carrascoso, R López-Nebreda, N Agraït, R Frisenda, A Castellanos-Gomez, *Microheater actuators as a versatile platform for strain engineering in 2D materials*, *Nano Letters*, **20**, 5339, 2020
- [58] A Mazaheri, M Lee, HSJ van der Zant, R Frisenda, A Castellanos-Gomez, *MoS₂-on-paper optoelectronics: drawing photodetectors with van der Waals semiconductors beyond graphite*, *Nanoscale*, **12**, 19068, 2020
- [57] Q Zhao, F Carrascoso, P Gant, T Wang, R Frisenda, A Castellanos-Gomez, *A system to test 2D optoelectronic devices in high vacuum*, *Journal of Physics: Materials*, **3**, 036001, 2020
- [56] R Frisenda, A Castellanos-Gomez, *Strain creates a trion factory*, *Nature Photonics*, **14**, 269, 2020
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