MINISTERIO DE CIENCIA E INNOVACIÓN

CURRICULUM VITAE (maximum 4 pages)

AGENCIA ESTATAL DE INVESTIGACIÓN

CV date	2022/01/05

Part A. PERSONAL INFORMATION

First and Family name	Javier Tornos Castillo		
Social Security, Passport, ID number	50751257-D	Age	37
Researcher codes	Open Researcher and Contributor ID (ORCID**)	0000-0001-7542-3137	
	SCOPUS Author ID (*)	55845179400	
	WoS Researcher ID (*)	Q-5249-2017	

A.1. Current position

Name of University/Institution	Universidad Complutense de Madrid			
Department	Física de Materiales			
Address and Country	Plaza Ciencias 1, 28040, Madrid, Spain			
Phone number	+34 913945220	E-mail	jtornosc@ucm.es	
Current position	Assistant Professor		From	2019/08/20
Key words	Quantum Oxide Materials, Emergent Phenomena, Nano-devices			

A.2. Education

PhD in Physics	Universidad Complutense de Madrid	2014
Master Degree	Universidad Complutense de Madrid	2009
Degree in Physics	Universidad Complutense de Madrid	2009

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

- Citing Articles: 441
- Average Citations per Year: 44.1
- Total Q1 Publications: 19
- h-index = 12

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

Along my research career, I have published 18 articles. Over the last 8 years the list includes 1 Nature Nanotechnology, 1 Nature Physics, 1 Nature Communications and 3 Physical Review Letters. I have submitted 43 works to national and international conferences. Additionally, I have worked in five funded national R&D projects (250,000 EU) and two international R&D projects (Graphene Flagship).

I am a Condensed Matter Physicist in emerging phenomena of quantum materials nano-devices. The main goal of our research is to discover novel exotic quantum phenomena at oxide interfaces and use them to create functional nano-devices. My scientific activity lines include proximity effects, multiferroic tunnel junctions, metal-insulator transitions and electron correlations. I have studied a large variety of materials (superconducting, ferromagnetic, ferroelectrics, strong spin-orbit coupling ...) and working with many different experimental techniques (epitaxial growth, nano-fabrication, magnetotransport measurements, x-ray magnetic circular dichroism ...).

I have collaborated with scientific researchers, such as J. Villegas, A. Barthelemy and M. Bibes at CNRS-Thales (France), S. te Velthuis, Y. Liu and D. Haskel at Argonne National Laboratory (USA) or S. J. Pennycook at Oak Ridge National Laboratory (USA). I have also performed experiments in large scientific facilities such as ISIS Neutron and muon source (UK), BESSY II (Germany), Diamond Light Source (UK), Advanced Photon Source (USA), ALBA (Spain) and Spallation Neutron Source (USA). In addition, I have served as a referee for Physical Review Letters, Physical Review B and Physical Review Applied journals of the American Physicsal Society, since 2013.

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

C.1. Publications *(see instructions)*

1) D. Sanchez-Manzano, S. Mesoraca, F. A. Cuellar, M. Cabero, V. Rouco, G. Orfila, X. Palermo, A. Balan, L. Marcano, A. Sander, M. Rocci, J. Garcia-Barriocanal, F. Gallego, J. Tornos, A. Rivera, F. Mompean, M. Garcia-Hernandez, J. M. Gonzalez-Calbet, C. Leon, S. Valencia, C. Feuillet-Palma, N. Bergeal, A. I. Buzdin, J. Lesueur, J. E. Villegas, J. Santamaria (2021) "Extremely long-range, high-temperature Josephson coupling across a half-metallic ferromagnet". **Nature Materials**. doi.org/10.1038/s41563-021-01162-5

2) M. W. Yoo, J. Tornos, A. Sander, L. F. Lin, N. Mohanta, A. Peralta, D. Sanchez-Manzano, F. Gallego, D. Haskel, J. W. Freeland, D. J. Keavney, Y. Choi, J. Strempfer, X. Wang, M. Cabero, H. B. Vasili, M. Valvidares, G. Sanchez-Santolino, J. M. Gonzalez-Calbet, A. Rivera, C. Leon, S. Rosenkranz, M. Bibes, A. Barthelemy, A. Anane, E. Dagotto, S. Okamoto, S. G. E. Velthuis, J. Santamaria, and J. E. Villegas. (2021) "Large Intrinsic Anomalous Hall Effect in $SrIrO_3$ Induced by Magnetic Proximity Effect", **Nature Communications** 12, 3283.

3) D. Hernandez-Martin, F. Gallego, J. Tornos, V. Rouco, J. I. Beltran, C. Munuera, D. Sanchez-Manzano, M. Cabero, F. Cuellar, D. Arias, G. Sanchez-Santolino, F. J. Mompean, M. Garcia-Hernandez, A. Rivera-Calzada, S. J. Pennycook, M. Varela, C. M. Muñoz, Z. Sefrioui, C. Leon, and J. Santamaria. (2020) "Controlled Sign Reversal of Electroresistance in Oxide Tunnel Junctions by Electrochemical-Ferroelectric Coupling", **Physical Review Letters** 125, 266802.

4) J. Tornos, F. Gallego, S. Valencia, Y. H. Liu, V. Rouco, V.Lauter, R. Abrudan, C. Luo, H. Ryll, Q. Wang, D. Hernandez-Martin, G. Orfila, M. Cabero, F. Cuellar, D. Arias, F. J. Mompean, M. Garcia-Hernandez, F. Radu, T. R. Charlton, A. Rivera-Calzada, Z. Sefrioui, S. G. E. Velthuis, C. Leon, and J. Santamaria. (2019). "Ferroelectric Control of Interface Spin Filtering in Multiferroic Tunnel Junction", **Physical Review Letters** 122, 037601.

5) G. Sanchez-Santolino*, J. Tornos*, D. Hernandez-Martin, J. I. Beltran, C. Munuera, M. Cabero, A. Perez-Muñoz, J. Ricote, F. Mompean, M. Garcia-Hernandez, Z. Sefrioui, C. Leon, S. J. Pennycook, M. C. Muñoz, M. Varela, and J. Santamaria. (2017). "Resonant electron tunnelling assisted by charged domain walls in multiferroic tunnel junctions", **Nature Nanotechnology** 12, 655-662.

6) F. Y Bruno, M. N. Grisolia, C. Visani, S. Valencia, M. Varela, R. Abrudan, J. Tornos, A. Rivera-Calzada, A. A. Ünal, S. J. Pennycook, Z. Sefrioui, C. Leon, J. E. Villegas, J. Santamaria, A. Barthélémy, and M. Bibes. (2015). "Insight into spin transport in oxide heterostructures from interface-resolved magnetic mapping", **Nature Communications** 6, 6306.

7) Juan Salafranca, Julián Rincón, Javier Tornos, Carlos León, Jacobo Santamaria, Elbio Dagotto, Stephen J. Pennycook, and Maria Varela. (2014). "Competition between Covalent Bonding and Charge Transfer at Complex-Oxide Interfaces", **Physical Review Letters** 112, 196802.

8) Mirko Rocci, Javier Tornos, Alberto Rivera-Calzada, Zouhair Sefrioui, Marta Clement, Enrique Iborra, Carlos Leon, and Jacobo Santamaria, "Resistive switching in manganite/graphene hybrid planar nanostructures", Appl. Phys. Lett. 104, 102408 (2014).

9) C. Visani, Z. Sefrioui, J. Tornos, C. Leon, J. Briatico, M. Bibes, A. Barthélémy, J. Santamaría, and Javier E. Villegas. (2012). "Equal-spin Andreev reflection and

long-range coherent transport in high-temperature superconductor/half-metallic ferromagnet junctions", **Nature Physics** 8, 539.

10) Yaohua Liu, C. Visani, N. M. Nemes, M. R. Fitzsimmons , L. Y. Zhu , J. Tornos, M. Garcia-Hernandez, M. Zhernenkov, A. Hoffmann, C. Leon, J. Santamaria, S. G. E. te Velthuis. (2012). "Effect of Interface-Induced Exchange Fields on Cuprate-Manganite Spin Switches", **Physical Review Letters** 108, 207205.

11) C. Visani, J. Tornos, N. M. Nemes, M. Rocci, C. Leon, J. Santamaria, S. G. E. te Velthuis, Yaohua Liu, A. Hoffmann, J. W. Freeland, M. Garcia-Hernandez, M. R. Fitzsimmons, B. J. Kirby, M. Varela, S. J. Pennycook. (2011). "Symmetrical interfacial reconstruction and magnetism in $La_{0.7}Ca_{0.3}MnO_3/YBa_2Cu_3O_7/La_{0.7}Ca_{0.3}MnO_3$ heterostructures", Phys. Rev. B 84, 060405.

C.2. Research projects

1) MAT2008-06517-C02-02. Ministerio de Ciencia e Innovación. "Electrónica de óxidos a la nanoescala: ingeniería de interfases en heteroestructuras para dispositivos magnetoelectrónicos". PI: Carlos León Yebra.2009-2012. 242000€

2) CONSOLIDER. Ministerio de Ciencia e Innovación Ciencia de materiales a resolución sub-angstrom CSD2009-00019-I. PI: Jacobo Santamaría Sánchez-Barriga. 2009-2016. 352071€

3) PHAMA. Comunidad Autónoma de Madrid. Materiales híbridos avanzados para aplicaciones fotónicas S2209/MAT-1756. PI: Jacobo Santamaría Sánchez-Barriga.2010-2014. 126.150€

4) MAT2011-27470-C02-01. Ministerio de Ciencia e Innovación. Interfases de óxidos complejos en espintrónica: entender, diseñar y aplicar. PI: Jacobo Santamaría Sánchez-Barriga.2012-2016. 210000€

5) Graphene-based revolutions in ICT and beyond. European Union. PI: Mar García Hernández. 2015-2016

6) Graphene-based disruptive technologies. PI: Mar García Hernández. European Union. Project- 2016-2018

7) MAT2014-52405-C2-1-R Optimización de propiedades electrónicas de dispositivos de interfase: spin-orbitrónica y spin-memristores Josephson ferromagnético. PI: Jacobo Santamaría Sánchez-Barriga. 2015-2019. 363000€

8) MAT2017-87134-C2-1-R (AEI/FEDER, UE) Hacia materiales cuánticos emergentes en interfases de óxidos complejos. PI: Jacobo Santamaría Sánchez-Barriga. 2018-2020. 266200€

9) New functionalities for a 2D oxide electronics: quantum matter induced by proximity phenomena. Agencia Estatal de Investigación (Retos) PID2020-118078RB-I00 2021-2023 2021 -2023. PI J. Santamaria y C. León. 370.000€

10) Estados correlacionados en películas de óxidos autosoportadas. Y2020/NMT-6661-CAIRO. Ayudas para la realización de proyectos sinérgicos de I+D 2020 de la CAM. Coordinador J. Santamaria. 730.000€.

C.3. Contracts, technological or transfer merits

C.4. Patents

C.5. Referee

Referee for Physical Review Letters, Physical Review B and Physical Review Applied journals of the American Physical Society, since 2013.

C.6, C.7…