CV Date	23/11/2023

Part A. PERSONAL INFORMATION

First Name	Juan		
Family Name	de la Figuera Bayón		
Sex	Not Specified	Date of Birth	
ID number Social Security, Passport			
URL Web	https://surfmoss.iqfr.csic.es/es/members/29-current-members/juan		
Email Address	juan.delafiguera@csic.es		
Open Researcher and Contributor ID (ORCID)	0000-0002-7014-4777		

A.1. Current position

Job Title	Investigador Científico		
Starting date	2016		
Institution	Consejo Superior de Investigaciones Científicas		
Department / Centre	Dto. de Sistemas de Baja Dimensionalidad, Superficies y Materia Condensada / Instituto de Química Física Rocasolano		
Country		Phone Number	
Keywords	Surfaces and interphases; Physics - Structure of materials; Fisica lm -- sistemas de bajas dimensiones y mesoscopicos [eng]		

A.2. Previous positions (Research Career breaks included)

Period	Job Title / Name of Employer / Country
2013 - 2017	Director / Instituto de Química Física Rocasolano

A.3. Education

Degree/Master/PhD	University / Country	Year
Programa Oficial de Doctorado en Ciencias Físicas	Universidad Autónoma de Madrid	1995
Licenciado en Ciencias Físicas	Universidad Autónoma de Madrid	1990

Part B. CV SUMMARY

I started my research career with my PhD under the supervision of Prof. Carmen Ocal, in the Surface Science Group of Prof. Rodolfo Miranda. After a postdoctoral stay at the Universidad Complutense de Madrid (UCM) with Prof. Juan M. Rojo, from 1997 to 2002 I worked at Sandia National Laboratories in the group of Dr. Robert Q. Hwang, first as a Fulbright Fellow, and later as a term researcher. After 2002 I returned to Spain, initially with a Ramon y Cajal contract, first in the group of Prof. Rodolfo Miranda and later as an independent researcher at the Centro de Microanalisis de Materiales (UAM). In 2007 I joined as staff researcher (científico titular) the Surface Analysis and Mossbaüer Spectroscopy Group (http://surfmoss.iqfr.csic.es) at the Instituto de Física Química “Rocasolano” (part of the CSIC), and since 2016 as a senior researcher (investigador científico) at the same group.

The main theme of my work, in experimental surface science, has been to contribute to the understanding of the behavior and consequences of defects on the surface of a material with an emphasis on employing imaging (i.e. real space) techniques, and in particular performing dynamic observations. I have worked on scanning tunneling microscopy (STM) during my PhD (-1995) and my two postdocs (1996-1997 at the UCM and 1997-2002 at Sandia National Labs/USA), including the design, construction and data acquisition of STM systems (Rev.Sci.Inst. 2007). Relevant results were the stacking faults detected in cobalt islands on copper (PRB2001), and that isolated vacancy islands on metal surfaces do a Brownian motion (SolidStatComm. 1993), while a network of them vibrate giving hints of the forces that hold

them in place (Nature 1999). In the later years (after coming back to Spain) I devoted my time to continue the study of defects on surfaces by means of low-energy electron microscopy (LEEM) in collaboration with Kevin McCarty (Sandia Nat. Labs) and Andreas Schmid (Berkely Lab). Low-energy electron microscopy is a technique that employs a low energy electron beam to form a magnified image of the surface. I have introduced the technique in Spain and contributed to expand its application. For example, combining it with STM to understand the evolution of dislocations in copper ultrathin films (Science 2005, Surf Sci. 2019). I have also applied the spin-polarized version of it (SPLEEM) to study surface magnetism, using it to understand the change of the magnetization direction at consecutive atomic layers of cobalt (PRL 2006) to the magnetic domain evolution in magnetite (SciRep 2018). In the last decade, I have become involved in the use of LEEMs as photoelectron microscopes (PEEM) when coupled to a synchrotron x-ray source, or even UV lab sources. I have thus become a frequent user of the Alba synchrotron (in collaboration with Dra. Lucía Aballe), for example growing atomically flat
cobalt ferrite nanostructures (AdvMat 2015), or mapping the magnetization vector in magnetite nanostructures (Nanoscale 2018). As a summary, my group is the leading LEEM groupSpain, with over 25 publications in the field. Since 2017, my group houses the only laboratory based LEEM instrument in Spain, and I am working to popularize the technique among researchers in film growth, 2D materials and magnetism, as well as extending it into new areas such as antiferromagnet research (by laser-PEEM).

I have one patent for a gas sensor based on the change of magnetization in a thin cobalt film, and I regularly give talks about Nanoscience and related themes both at high schools during the year as well as during the outreach days of my institution. I have supervised three Master students and six PhD students. Some of the latter are now staff members at research institutions (Sandia National Labs -USA-, Solaris Synchrotron Centre -Poland-) while others works in the industry. I contributed to the creation of the National Association of Ramon y Cajal Researchers of which I was the first president. I also became involved with the Association for the Advancement of Science and Technology in Spain (AACTE), also being its president for one term. Now I am a member of the executive council of the Spanish Vacuum Association (ASEVA), organizing vacuum technology teaching. I have been the vicedirector (2010-2013) and then director of the Instituto de Física Química "Rocasolano" in the period 2013-2017.

I have five "sexenios" (evaluated 6-year periods), over 120 publications with more than 2500 total citations (WoS) with publications in Science, Nature, Phys. Rev. Lett., J. Amer. Chem. Soc., and Adv. Mat. among others (the h-index is 30). The citations and other metrics can be found with my researcherID E-7046-2010. In more than half of the publications I am either the first author, the last author or the corresponding one. I also have over 60 invited lectures, and over 140 contributions at international conferences.

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (nº x / nº y): position / total authors. If applicable, indicate the number of citations

1 **Scientific paper**. Ruiz-Gómez, Sandra; Pérez, Lucas; Mascaraque, Arantzazu; Santos, Benito; Gabaly, Farid El; Schmid, Andreas K.; Figuera, Juan de la. 2023. Stacking influence on the in-plane magnetic anisotropy in a 2D magnetic system. Nanoscale. ISSN 2040-3372. https://doi.org/10.1039/D3NR00348E

2 **Scientific paper**. del Campo, Adolfo; Ruiz-Gómez, Sandra; Trapero, Eva M.; et al; de la Figuera, Juan. 2022. Size Effects in the Verwey Transition of Nanometer-Thick Micrometer-Wide Magnetite Crystals. The Journal of Physical Chemistry C. 126-32, pp.13755-13761. https://doi.org/10.1021/acs.jpcc.2c03391

3 **Scientific paper**. Soria, G. D.; Jenus, P.; Marco, J. F.; et al; de la Figuera, J.2019. Strontium hexaferrite platelets: a comprehensive soft X-ray absorption and Mossbauer spectroscopy study. Scientific Reports. 9. ISSN 2045-2322. WOS (22) https://doi.org/10.1038/s41598-019-48010-w

4 **Scientific paper**. Martin-Garcia, Laura; Chen, Gong; Montana, Yaiza; Mascaraque, Arantzazu; Pabon, Beatriz M.; Schmid, Andreas K.; de la Figuera, Juan. 2018. Memory effect and magnetocrystalline anisotropy impact on the surface magnetic domains of magnetite(001). Scientific Reports. 8. ISSN 2045-2322. https://doi.org/10.1038/s41598-018-24160-1

5 **Scientific paper**. El Gabaly, F; Gallego, S; Muñoz, C; et al; de la Figuera, J. 2006. Imaging spin-reorientation transitions in consecutive atomic Co layers on Ru(0001). Physical Review Letters. 96-14, pp.147202-147202. ISSN 0031-9007. WOS (56) https://doi.org/10.1103/PhysRevLett.96.147202

6 **Scientific paper**. El Gabaly, F; Ling, WLW; McCarty, KF; de la Figuera, J. 2005. The importance of threading dislocations on the motion of domain boundaries in thin films. Science. 308-5726, pp.1303-1305. ISSN 0036-8075. WOS (12) https://doi.org/10.1126/science.1109889

7 **Scientific paper**. Pohl, K; Bartelt, MC; de la Figuera, J; Bartelt, NC; Hrbek, J; Hwang, RQ. 1999. Identifying the forces responsible for self-organization of nanostructures at crystal surfaces. Nature. 397-6716, pp.238-241. ISSN 0028-0836. WOS (154) https://doi.org/10.1038/16667

C.3. Research projects and contracts

1 **Project**. PID2021-124585NB-C31, Growth and domain observation and manipulation in antiferromagnets and hybrid materials and devices for spintronics. Agencia Estatal de Investigación. Juan de la Figuera Bayón. (Instituto de Química Física Rocasolano). 01/09/2022-31/08/2025. 110.000 €. Co-ordinator.

2 **Project**. TED2021-130957B-C54, Development of nanostructured rare-earth-free magnetic materials. Agencia Estatal de Investigación. Juan de la Figuera. (Instituto de Química Física Rocasolano). 01/12/2022-30/11/2024. 200.000 €. Principal investigator.

3 **Project**. RTI2018-095303-B-C51, Transition metal oxide nanostructures for ultrafast and low dissipation signal processing devices. Agencia Estatal de Investigación. Juan de la Figuera. (Instituto de Química Física "Rocasolano"). 01/01/2019-31/12/2021. 210.000 €. Co-ordinator.

4 **Project**. 720853, Anisometric permanent hybrid magnets based on inexpensive and non-critical materials. H2020-NMBP-2016-2017. Adrian Quesada Michelena (coordinator). (Agencia Estatal Consejo Superior de Investigaciones Científicas). 01/01/2017-31/12/2019. 4.948.707 €. Team member.

5 **Project**. CSIC15-EE-3056, Microscopio de electrones de baja energía para dinámica y crecimiento en superficies. de la Figuera. (Instituto de Química Física Rocasolano). 01/01/2016-31/12/2017. 98.861,02 €. Principal investigator.

C.4. Activities of technology / knowledge transfer and results exploitation

Patent of invention. Andreas K. Schmid; Arantzazu Mascaraque; Benito Santos; Juan De la Figuera Bayón. 8,826,726. Gas Sensor PCT/US2010/032990 United States of America. 09/09/2014. Berkeley National Laboratory.