



## CURRICULUM VITAE ABREVIADO (CVA)

**IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.**

Part A. PERSONAL INFORMATION		CV date	10.10.2024
First name	César		
Family name	de la Fuente del Rey		
Gender (*)	Male	Birth date)	12/02/1967
ID number			G99372015
e-mail	<a href="mailto:cesar@unizar.es">cesar@unizar.es</a>	URL Web	
Open Research and Contributor ID (ORCID)(*)		0000-0001-6117-9858	

(\*) Mandatory

### A.1. Current position

Position	Profesor Titular de Universidad		
Initial date	01.03.2001		
Institution	University of Zaragoza		
Departament/Center	Depto. Física de la Materia Condensada		
Country	Spain	Teleph. number	+34 662086270
Key words	Kondo effect, magnetic materials, Ctrystal field, Magnetoelasticity, Quantum pase transitions, Critical points, Heavy Fermions, Ab-initio calculations, Magnetic excitations		

### A.2. Previous positions (research activity interruptions, art. 45.2.c))

Period	Position/Institution/Country/Interruption cause
1993-2001	Associate Professor/ University of Zaragoza/ Spain
1996-1997	Postdoctoral FPI stay/ Oxford University/ UK

### A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Physics	University of Zaragoza, Spain	1995
Graduate in Physics	University of Zaragoza, Spain	1990

## Part B. CV SUMMARY

Publications: 57 articles of the JCR. Total cites: 242, aprox. 15.0 cites/year. ÍH index. 10

PhD in Sciences from the University of Zaragoza with a Doctoral Thesis titled: "Magnetostriiction and Irreversibilities in Rare Earth Intermetallics with Random Magnetic Anisotropy and High Tc Superconductors" under the co-direction of Professors A. del Moral and J.I. Arnaudas.

Scientific-professional activities: Full-time Associate Professor at the Department of Condensed Matter Physics from October 1991 to March 2001. Research fellow in the EU-BIREM project (January-October 1991), FPI Scholarship at the University of Oxford in 1996.

Awards: Extraordinary PhD Award at the University of Zaragoza (1996).

Scientific-technical achievements:

At the beginning and during 10 years, I participated in various research projects related to magnetoelasticity in crystalline and amorphous rare-earth (RE) intermetallic systems such as:  $(\text{Tb}_x\text{Y}_{1-x})\text{Al}_2$ ,  $0 < x < 1$ , with weak random magnetic anisotropy (RMA),  $(\text{Gd}_x\text{Tb}_{1-x})_2\text{Fe}$ ,  $0 < x < 1$ , with strong RMA, and in high  $T_c$  superconductors (SC) of the REBaCuO type in the paramagnetic phase. In all of these, magnetoelasticity was the fundamental method used to understand the quantum magnetic behavior of these systems. Some of the most important achievements were the violation of Akulov's law in systems with weak RMA, the characterization of the quantum tunneling effect of magnetization in mesoscopic scales for systems with strong RMA, and the magnetoelastic effect generated by the unpinning of vortex centers inside a high  $T_c$  SC under the action of an external, intense magnetic field.

For the past 20 years, I have begun participating in projects based on the study of the magnetic properties of multilayers, thin films, and low-dimensional systems based on pure RE elements. These materials were initially obtained at the University of Oxford and their magnetic behaviors were studied from a magnetoelastic perspective. Since the creation of the Aragón Nanoscience Institute, I have also participated in projects focused on the study of tunneling microscopies, STM, where my contributions mainly focus on the development of different structural models to explain the experimental measurements in STM using first-principles calculations within DFT, with the following methods: Pseudopotentials, "LAPW+lo and Full-potential," and maximization of localized Wannier states. I am currently working on an RES project at the National Supercomputing Center.

In the last years, I had participated in projects focused on the magnetoelastic study of intermetallics with Cerium in Kondo semiconductor series  $\text{CeNi}(\text{Sn}_x\text{Ge}_{1-x})$ ,  $0 < x < 1$ , and non-centrosymmetric Kondo lattices  $\text{CeXAl}_3$  ( $X = \text{Au}, \text{Cu}, \text{Cu}_x\text{Ag}_{1-x}$ ,  $0 < x < 1$ ) where the existence of unconventional SC under hydrostatic pressure was experimentally observed. In  $\text{CeXAl}_3$  series, the magnetoelastic study is related to magnetic excitations at low temperatures. One of the most relevant achievements was the characterization of the magnetoelastic behavior of the quasi-states: "vibrons," or magnetic excitations derived from the magnetoelastic coupling between the crystalline field of the Cerium ion lattice and the normal vibrational phonon modes of the crystalline lattice. These magnetic excitations indicate the existence of an effective attraction between cerium magnetic moments due to an induced antiferromagnetic coupling that challenging the well-known RKKY interaction.

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

### **C.1. Publications** *(most relevant of the last years)*

1. "Crystal electric field and possible coupling with phonons in Kondo lattice CeCuGa<sub>3</sub>", V. K. Anand; A. Fraile; D. T. Adroja; Shivani Sharma; Rajesh Tripathi; C. Ritter; C. de la Fuente; P. K. Biswas; V. Garcia Sakai; A. del Moral et al., Phys. Rev. B 104, 174438 (2021).
2. "Vibron quasi-bound state stability for tetragonal CeCu<sub>x</sub>Ag<sub>1-x</sub>Al<sub>3</sub>", C. de la Fuente, A. del Moral, J.W. Taylor and D.T. Adroja, J. Magn. Magn. Mater. 167541, 530 (2021).
3. "Mixed 4f population of Tm adatoms on insulating Cu<sub>2</sub>N islands ", David Coffey, César de la Fuente, Miguel Ciria, David Serrate, Sebastian Loth and José Ignacio Arnaudas, Phys. Chem. Chem. Phys. 22, 196-202 (2020).
4. "Crystal structure and local ordering in epitaxial Fe<sub>100-x</sub>Ga<sub>x</sub>/(001)MgO", Miguel Ciria, Maria Grazia Proietti, Edna C. Corredor, David Coffey, Adrian Begue, Cesar de la Fuente, Jose I. Arnaudas, A. Ibarra. Journal of Alloys and Compounds, 767, Pag. 905 (2018).

### **C.2. Research projects**

1. "Magnetostriuctive nanomaterials for sensor and energy conversion applications"/ Funding entity and call: FEDER funds - MINECO. Ministry of Economy and Competitiveness (MAT2015-66726-R (MINECO)). IP: M. Ciria / Affiliated entity: INSTITUTE OF MATERIALS SCIENCE OF ARAGÓN – CSIC - University of Zaragoza / Start and end date: 2016-2018 / Grant amount: €121,000.00 / Type of participation: Researcher.