MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES

CURRICULUM VITAE (maximum 4 pages)

CV date	Sep 21, 2018

Part A. PERSONAL INFORMATION

First and Family name	Francisco B. Pérez Bernal		
Social Security, Passport, ID number	28729192F	Age	49
Researcher numbers	Researcher ID	K-4401-2014	
	Orcid code	0000-0002-3009-3696	

A.1. Current position

Name of University/Institution	University of Huelva		
Department	Fac. Ciencias Experimentales, Depto. Ciencias Integradas		
Address and Country	Campus del Carmen, Avda. FFAA s/n. Huelva 21071		
Phone number	959219789	E-mail	Francisco.perez@dfaie.uhu.es
Current position	Profesor Titular de Universidad	From	April 13, 2009
UNESCO code	220717, 220719, 220920, 221307		
Keywords	Algebraic models in molecular and nuclear structure. Ground State Quantum Phase Transitions. Excited State Quantum Phase Transitions. Coupling to the continuum of weakly-bound quantum systems. Calculations.		

A.2. Education

PhD	University	Year
Licenciatura en Física	Universidad de Sevilla	Junio 1993
Doctorado en Física (PhD)	Universidad de Sevilla	Junio 1998

A.3. JCR articles, h Index, thesis supervised…

Four six-year periods of research awarded by the CNEAI (last one: 2012-2017).
Habilitation for “Catedrático de Universidad” obtained from ANECA on April 24th, 2018.
Advisor of two PhD theses during last ten years and currently advising another PhD thesis.
Web of Science (WoS): 85 papers, 1190 total times cited, h index = 20.
WoS, number of papers in first quartile (Q1): 24 papers
WoS, average number of times cited last five years: 100 citations/year.

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

My research activity started with my PhD thesis (1994-1998), under the advisory of J.M. Arias (University of Sevilla - US) and R. Lemus (UNAM, México). The thesis focused on the application of the 1D limit of the vibron model (an approach based on Lie algebras) to the study of the vibrational spectra of polyatomic molecules, and the interplay of discrete and continuous symmetries in this problem. This line of research has evolved and is still active, involving research groups in the University of Huelva (UHU), the CSIC, and UNAM, searching connections between algebraic and traditional approaches to molecular structure and modeling Raman spectra (18 ISI papers published, e.g. Ref. [5]).

My research in algebraic models continued as a postdoc in the Yale University Center for Theoretical Physics (USA). I worked with P.H. Vaccaro and F. Iachello on an algebraic approach to compute Franck-Condon factors (5 ISI papers). The work was initially limited to modeling vibrational spectra, but later on it included coupling with rotations to model linear to bent geometry transitions, Quantum Phase Transitions, and Excited State Quantum Phase Transitions in bosonic many body systems. I have extensively studied the 2D limit of the vibron model, that has proved very useful in the modeling of bending dynamics, providing a simple and unified framework for the study of quasilinear and non rigid molecules [10]. This is still an active line of research, with an ongoing collaboration between the universities of Huelva, Yale, Yeshiva, Padova, Sevilla, UNAM, and Granada; studying different aspects of the dynamics of single ([3, 6, 10]; 11 ISI papers) and coupled sytems ([4, 9]; 5 ISI papers), and the structure of endohedral species, in particular of H2@C60 ([1]; 1 ISI paper).

I also work on a line of research aiming to describe weakly-bound quantum systems with a pseudostate continuum discretization based on a transformed harmonic oscillator basis. This line started in 2001 through a collaboration with researchers in the US. This approach, initially started for 1D systems, has been extended to 3D systems and applied to halo nuclei reaction calculations ([8], 10 ISI papers). Thanks to a José Castillejo grant in 2008, this line has been also developed in collaboration with researchers in the Padova and Tohoku universities, with the study of structure and transfer problems in a 1D model for Borromean halo nuclei, a three-body system bound by a density-dependent contact residual interaction (e.g. [2], 3 ISI papers).

I have considerable experience working with GNU/Linux systems, being responsible for the setup of Linux clusters in the US and the UHU. This experience helped me in the period 2002-2009 when I worked on the setup of the DAQ system of the UHU nuclear physics group, participating in several experiments (e.g. [7], 8 ISI papers). I am also corresponsible person of the recently installed system HPC@UHU.

I have attended approximately 40 internatinal meetings, communicating my research results, with 6 invited talks, and participated in the organization of several international meetings (see below).

In the UHU I have been appointed as the director of the recently created University of Huelva Research Center for Physics, Mathematics and Computation. I am a member of the Academic Committee of the “Doctorado en Ciencia y Tecnología Industrial y Ambiental”, being the responsible person for the line “Física, Matemáticas y Computación”.

Part C. RELEVANT MERITS

C.1. Publications (including books)

1. L. Fortunato and F. Pérez-Bernal; *Algebraic theory of endohedrally confined diatomic molecules: Application to H-2@C-60*.
PHYSICAL REVIEW A 94 032508-8pp. (2016) Q1, Times cited 0.
2. L. Moschini, F. Pérez-Bernal, and A. Vitturi; *Bound and unbound nuclear systems at the drip lines: a one-dimensional model.*
J. OF PHYSICS G-NUC. AND PART. PHYS. 43 045112-23pp. (2016) Q1, Times cited 1.
3. L. Santos and F. Pérez Bernal; *Structure of eigenstates and quench dynamics at an excited-state quantum phase transition.*
PHYSICAL REVIEW A 92 050101-5pp. (2015) Q1, Times cited: 20.
4. D. Larese, M.A. Caprio, F. Pérez-Bernal, and F. Iachello; *A study of the bending motion in tetratomic molecules by the algebraic operator expansion method*.
JOURNAL OF CHEMICAL PHYSICS 140 014304-14pp. (2014) Q1,Times cited: 9.
5. R. Lemus, M. Sánchez-Castellanos, F. Pérez-Bernal, J.M. Fernández, and M. Carvajal; *Simulation of the Raman Spectrum of CO2: bridging the gap between algebraic models and experimental spectra.*
JOURNAL OF CHEMICAL PHYSICS 141 054306-14pp. (2014) Q1,Times cited: 10.
6. D. Larese, F. Pérez-Bernal and F. Iachello; *Signatures of quantum phase transitions and excited state quantum phase transitions in the vibrational bending dynamics of triatomic molecules.*
JOURNAL OF MOLECULAR STRUCTURE 1051 310-327. (2013) Q3, Times cited: 23.
7. A. di Pietro et al. (28/18); *Elastic Scattering and Reaction Mechanisms of the Halo Nucleus Be-11 around the Coulomb Barrier.*
PHYSICAL REVIEW LETTERS 105 022701-5pp. (2010) Q1,Times cited: 106
8. A.M. Moro, J.M. Arias, J. Gómez-Camacho, and F. Pérez-Bernal; *Analytical transformed harmonic oscillator basis for continuum discretized coupled channels calculations.*
PHYSICAL REVIEW C 80 054605-10pp. (2009) Q1, Times cited: 24.
9. F. Iachello and F. Pérez-Bernal; *A novel algebraic scheme for describing coupled benders in tetratomic molecules.*
JOURNAL OF PHYSICAL CHEMISTRY A 113 13273-13286 (2009) Q1, Times cited: 11.

10. F. Pérez-Bernal and F. Iachello; *Algebraic approach to two-dimensional systems: Shape phase transitions, monodromy, and thermodynamic quantities.*
PHYSICAL REVIEW A 77 032115-21pp. (2008) Q1, Times cited: 62.

C.2. Research projects and grants

Title: Financiación EPIT-UHU al Centro de Estudios Avanzados en Física, Matemáticas y Computación
Funding Entity: Estrategia de política de investigación y de transferencia de la Universidad de Huelva
Organizations involved: Universidad de Huelva
Duration: 2018 Grant Amount: 30,000 eur
Responsible person: Francisco Pérez-Bernal
Number of participants: 16

Title: Equipamiento de Cálculo Científico de Alto Rendimiento @UHU (UNHU15-CE-2848)
Funding Entity: Ayudas a Infraestructuras MINECO-Fondos FEDER
Organizations involved: Universidad de Huelva
Duration: 2016 – 2017 Grant Amount: 165,310 eur
Responsible person: José Enrique García Ramos
Number of participants: 15

Title: Fenómenos críticos en estructura molecular y nuclear. Análisis de especies moleculares de interés astrofísico (FIS2014-53448-C2-2-P)
Funding Entity: MINECO
Organizations involved: Universidad de Huelva and Universidad de Sevilla
Duration: 2015 – 2017 Grant Amount: 43,560 eur
Responsible person: Francisco Pérez Bernal
Number of participants: 3

Title: Caracterización de especies moleculares de interés astrofísico (FIS2011-28738-C02-02)
Funding Entity: Ministerio de Ciencia e Innovación
Organizations involved: Universidad de Huelva y Universidad de Sevilla
Duration: 2012 – 2015 Grant Amount: 26,000 eur
Responsible person: José Enrique García Ramos
Number of participants: 3

Title: Métodos Algebraicos en Sistemas Nucleares y Moleculares (ES/INFN, AIC-D-2011-0682)
Funding Entity: Acción complementaria Ministerio Ciencia e Innovación
Organizations involved: Universidad de Huelva y Universidad de Padua (Italia)
Duration: 2011 – 2012 Grant Amount: 2,000 eur
Responsible person: Francisco Pérez Bernal
Number of participants: 4

Title: Métodos Algebraicos en Sistemas Nucleares y Moleculares (FPA2008-03793-E/INFN)
Funding Entity: Acción complementaria Ministerio Ciencia e Innovación
Organizations involved: Universidad de Huelva y Universidad de Padua (Italia)
Duration: 2009 – 2010 Grant Amount: 2,500 eur
Responsible person: Francisco Pérez Bernal
Number of participants: 4

Title: Nuevos desarrollos en estructura cuántica de la materia (FQM 2962)
Funding Entity: Junta de Andalucía (Proy. excelencia P.A.I.)
Organizations involved: Universidad de Huelva
Duration: 2008 – 2010 Grant Amount: 188,000 eur
Responsible person: Mario Gómez Santamaría

Number of participants: 8

C.3. Contracts

C.4. Patents

C.5. Organization of international scientific meetings

Member of the international scientific committee of the "VIII Workshop on Quantum Phase Transitions in Nuclei and Many Body Systems (QPTn-8)" held in Prague (June 2016) and the QPTn-9 Workshop that held in Padova (May 2018).

Member of the organizing committee of "La Rábida: International Scientific Meeting on Nuclear Physics". La Rábida. Huelva on the editions held on June 2018, June 2015, and September 2012. Editor of the conference proceedings published in the volume 182 of the Springer Proceedings in Physics (Rábida 2015) snd in the volume 1541 on AIP Proceedings Series (Rábida 2012). The Rábida 2018 proceedings will be publised soon again in the Springer Proceedings in Physics

Member of the organizing committee of the "AMOC 2015 Anharmonicity in Medium-sized Molecules and Clusters". IEM-CSIC, Madrid. April 2015.

Member of the organizing committee of the "VII Workshop on Shape Phase Transitions and Critical Phenomena in Nuclei (QPTn-7)". Sevilla. March 2014.

Member of the international scientific committee of the International Congress "Beauty in Physics: Theory and Experiment" held in Morelos (México). May 2016.

C.6. Referee of ISI Journals

I have acted as referee for articles sent to the following journals:

Physical Review E, Journal of Physics B, European Physical Journal A, Journal of Molecular Spectroscopy, Physica Scripta, Chemical Physics Letters, Molecular Physics, Canadian Journal of Physics, Journal of Molecular Modeling, Computation, and Vibrational Spectroscopy.

C.7. Academic Fellowships

"FPD e I" predoctoral fellowship from the "Consejería de Educación y Ciencia" of the Junta de Andalucía (1995-1998).

Postdoctoral Fellow in Yale University financed from the DOE project of the Nuclear Theory Group in the Department of Physics (1999).

Postdoctoral Fellow from the "Ministerio de Educación Cultura y Deporte" (2000-2001).

"José Castillejo" Fellow from the Spanish "Ministerio de Educación Cultura y Deporte" (2008).