

Part A. PERSONAL INFORMATION

CV date

1/11/2022

First and Family name	MARIA JOSÉ GARCIA BORGE		
Social Security, Passport, ID number	666745K	Age	65
Researcher codes	WoS Researcher ID (*)	O-5852-2015	
	SCOPUS Author ID(*)	7005642865	
	Open Researcher and Contributor ID (ORCID) **	0000-0002-0779-9615	

(*) At least one of these is mandatory

(**) Mandatory

A.1. Current position

Name of University/Institution	Consejo Superior de Investigaciones Científicas		
Department	Espectroscopía Nuclear, Vibracional y Medios Desordenados / Instituto de Estructura de la Materia		
Address and Country	Serrano 113 bis		
Phone number	+34 687884484	E-mail	mj.borge@csic.es
Current position	Profesor de Investigación	From	2007
Key words	Experimental nuclear physics, exotic decay modes, ISOLDE, R3B		

A.2. Education

PhD	University	Year
Doctor en Ciencias Físicas	Universidad de Complutense de Madrid	1982

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

Taking into account the publications, I have 394 entries in the ISI web of Knowledge with more than 8038 citations. I have been cited in more than 4,226 articles of which 3,934 have been without self-citations. The average number of citations was 20,4 per article, with 402 citations in 2020. **H-index de 50.**

Number of supervised PhD-thesis: 12 , 5 in the last decade

Mario Cubero: Studies of the dispersion of ^9Li and ^{11}Li on a target of ^{208}Pb at energies around the Coulombian barrier *UCM 21-12-2012 Sobresaliente Cum Laude.*

Presently, researcher staff at CICANUM, S. Jose Costa Rica

Jose Antonio Briz Monago: Shape study of the $N=Z$ waiting point nucleus ^{72}Kr via beta decay. *UCM 14-11-2013 Sobresaliente Cum Laude*

Presently, staff (Contratado Doctor) at Fac CC Físicas, Universidad Complutense, Madrid

Vicente Pesudo Fortes: Analysis of the reaction of a one-neutron halo nucleus on a heavy target at energies around the Coulomb barrier. The case of ^{11}Be on ^{197}Au *UCM 19-06-2015 Sobresaliente Cum Laude*

Presently, permanent position as Científico Titular at CIEMAT, Madrid



Razvan Lica: Development of the ISOLDE Decay Station and g spectroscopic studies of exotic nuclei near the N=20 “Island of Inversion”

U. Politehnica of Bucurest, 13-11-2017

Presently, permanent researcher at Horia Hulubei National Institute for Physics and Nuclear Engineering, Bucurest Rumania

Javier Diaz Ovejas:

Exploring the halo structure via near-barrier scattering on 208Pb: the cases of 15C and 17Ne

UCM 13-09-2021 Sobresaliente Cum Laude

Area Sciences

A5. Physical Sciences and Technologies

A5.3 Particle physics, Astro particle physics and nuclear physics

Discipline ERC:

PE - DOMAIN PHYSICAL SCIENCE AND ENGINEERING

PE2 Fundamental Constituents of Matter

Unique contributions and expert activities

- Coordinator of the Particle, Astroparticle and Nuclear Physics (FPN) subarea of the National Research Funding Agency (2018-2021)
- Member of the C12 Committee on Nuclear Physics of IUPAP (2018-), Vice-chair since 2022 and Chair from 2025
- Member of the PE2 Evaluation Committee of ERC Advance Grant (2018-), Chair since 2022
- Editor-in-Chief of European Physics Journal A (2017-2025). In charge of nuclear structure experimental review papers
- Member of the Scientific Advisory Committee of IN2P3, (2024-2029)
- Member of the Scientific Advisory Committee of INFN, (2023-2027)
- Member of the Scientific Advisory Committee of KEK (2024)
- Member of the PAC de RIKEN JAPON (2019-2022) chair of the Committee (2021-2022)
- Member of the PAC of FRIB, EEUU (2021-2023)
- Member of the PAC of Laboratori Nazionali del Sud, Catania, Italia: (2009-2014), (2021-2023)
- Member of the Advisory Committee of RISP (Daejeon, Korea) (2013-)
- Member of the Advisory Committee of TRIUMF, ACOT (2014-2020)
- Member of the Joint Scientific Committee GSI-FAIR (2016-2021)
- Member of the Scientific Committee of the Helmholtz Institute in Mainz (HIM) (2017-2021)
- Experiment spokesperson ISOLDE and head of collaboration ISOLDE-CERN (2012-2017).
- GSI Exotic Nuclei Community (GENCO) membership Award, GSI, Germany, 2107
- Doctor Honoris Causa by the Chalmers University of Technology, Göteborg, Sweden (2015).
- Doctor Honoris Causa by the Universidad de Huelva, Huelva, Spain (2011).
- Member of the Scientific Council of GANIL/SPIRAL2 (Francia) (2013 - 2017).
- Chairperson of the ISOLDE Collaboration Committee (2009-2012).
- Head of the Department of Nuclear Physics and Statistical Physics of the IEM-CSIC (2003-2011; 2017-2021).
- Spanish representative in the Cooperation Committee ISOLDE, CERN (2003-2008).
- President of the Editorial Committee of the magazine Nuclear Physics News (2011-2015)
- Deputy Manager of the FPA program of the Subdirectorato General of Projects of Research (2010-2012).

- Evaluator of the National Agency for Evaluation and Foresight (ANEP) from 1990.
- Referee of high-impact scientific journals: Physical Review Letters, Physics Letters B, Physical Review C,
- Member of the Organizing Committee of about 15 international conferences.
- Member of the Scientific Advisory Committee of some 23 international conferences.
- Extraordinary prize awarded to the doctoral thesis in 1983 by the Complutense University of Madrid (Faculty of Physical Sciences)

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

My most outstanding contributions has been the discovery of new isotopes, new decay modes and the studies of beta-decay multiparticle emission to study the decay mechanism as well as the proper determination of the Gamow-Teller (GT) strength function. In the complementary reaction studies of these light nuclei, my most outstanding contribution has been to prove experimentally the expected differences on differential elastic scattering for halo nuclei compare to well bound stable nuclei at energies close to the Coulomb barrier due to polarization and coupling to the continuum. The beta-decay window is large and charged particle detection very sensitive so the GT-strength can be determined in a large energy region. The comparison with the Ikeda sum rule permits to learn about the renormalization of the axial-vector constant coupling as function of the mass.

In addition, after the discovery of the halo structure in some exotic nuclei my main contributions have been in using the beta decay probe to explore the halo structure. This has allowed for the first experimental evidence of sizeable presence of s-wave in the composition of the 2n-halo of ^{11}Li favoring its decoupling from the core, later corroborated by relativistic reaction studies in full kinematics. Later, the discovery of the decay mode of beta-delayed deuteron emission consequence of the existence of a two-neutron halo in ^6He . This decay mode happens in fact to the continuum due to the loosely bound character of the halo. Similarly, beta-delayed proton emission from the neutron-rich halo nucleus ^{11}Be has been identified. In recent years, we have studied the dynamic of the halo nuclei using post-accelerating beams that allow for acceleration near the Coulomb barrier. We explored possible dipole polarizability of halo nuclei in the presence of strong electrical field. Our results for the halo nuclei ^6He , ^{11}Li and ^{11}Be demonstrate that the system polarizes in the electric field of the target, and that the elastic scattering is smaller than in standard nuclei favoring direct breakup even in region classically forgiven. The differential cross section can only be explained if coupling to the continuum is included.

These studies have been done together with PhD students (11 PhD already defended) and in collaboration with groups from Spain and Aarhus (Denmark) and Chalmers (Sweden) Universities. This work was started with my fellowship at CERN (1984-86) continued at IEM-CSIC with some long stays at CERN (1990-95) and (2012-17). During my last stay at CERN as spokesperson of ISOLDE I played a crucial role in the realization of phase 1-2 of the HIE-ISOLDE project.

Part C. RELEVANT MERITS

C.1. Publications (including books)

- 1) J. Díaz_ovejas et al. "Suppression of Coulomb nuclear interference in the near-barrier elastic scattering of ^{17}Ne from ^{208}Pb ", Phys lett B 843 (2023) 138007
- 2) J. A. Briz, M.J.G. Borge, et al., Clarifying the structure of low lying states in ^{72}Br , Phys Rev C 105, 014323 (2022).

- 3) R. Spartà, A. Di Pietro, P. Figuera,...M.J.G. Borge et al., Probing proton halo effects in the 8B+64Zn collision around the Coulomb barrier, *Phys Letts B* 820 (2021) 136477
- 4) S. Viñals, E. Nácher, O. Tengblad, M.J.G. Borge, J.A. briz, A. Gad, M.Munch and A. Perea, Calibration and response function of a compact silicon-detector setup for charged-particle spectroscopy using GEANT4, *EPJA* 57 (2021) 49
- 5) R.J. Carroll, Zs. Podolyak,...M.J.G. Borge et al, Competition between allowed and first forbidden β -decay: the case of $^{208}\text{Hg} \rightarrow ^{208}\text{Tl}$, *Phys. Rev. Lett* 125 (2020) 192501
- 6) R. Lică *et al.* (IDS Collaboration) Normal and intruder configurations in ^{34}Si populated in the β^- decay of ^{34}Mg and ^{34}Al , *Phys. Rev. C* 100, 034306 (2019)
- 7) O. S. Kirsebom, *et.al* First Accurate Normalization of the β -delayed α Decay of N-16 and Implications for the C-12(α,γ)O-16 Astrophysical Reaction Rate
[Physical Review Letters 121\(14\), 142701\(2018\)](#)
- 8) V. Pesudo, *et.al.* Scattering of the Halo Nucleus Be-11 on Au-197 at Energies around the Coulomb Barrier. [Phys. Rev. Lett. 118, 152502 \(2017\)](#)
- 9) Maria Borge and Klaus Blaum, Editors of Focus on Exotic Beams at ISOLDE: A Laboratory Portrait *Journal of Physics G: Nuclear & Particle Vol 44* (2017) [Journal of Physics G: Nuclear and Particle Physics\(2017\);](#)
- Maria J G Borge and Klaus Blaum, Editorial *J. Phys. G: Nucl. Part. Phys.* **45**, (2018) 010301
- Maria J G Borge and Björn Jonson, ISOLDE Past, Present and Future, *J. Phys. G: Nucl. Part. Phys.* **44**, 044011 (2017)
- 10) M.J.G. Borge and K. Riisager
HIE-ISOLDE, the project and the physics opportunities
[Eur. Phys. J. A \(2016\) 52: 334](#)
- 11) M.J.G. Borge, *et al.*, Rare beta-p decays in light nuclei.
J. of Physics G: Nuclear and Particle Physics, Vol. 40,035109. (2013)
- 12) M. Cubero et al., Do Halo Nuclei Follow Rutherford Elastic Scattering at Energies Below the Barrier? The Case of ^{11}Li [Phys. Rev. Lett. 109, 262701, \(2012\)](#)
- 13) B. Blank and M.J.G. Borge, Nuclear structure at the proton drip line: Advances with nuclear decay studies, *Progress in Particle and Nuclear Physics*. 60 (2008) 403-483

C.2. Research projects and grants

- 1 EUROLABS, EU234719-01, HORIZON-INFRA-2021; Coordinator WP5,
2. Protontherapy and nuclear techniques for oncology, B2017BMD-3888, FN-UCM, IEM-CSIC, CIEMAT) 01/03/2018 – 30/06/2022 790.753,66 €
3. HIFI, a spectrometer for the study of nuclear reactions in HIE-ISOLDE (CSIC). FPA2017-87568-P 01/01/2018-31/12/2019. 48.400 €.
4. Dynamics and Structure of Exotic Nuclei Studied by Experiments (DENE3) PID2019-104390Gb-I00 01/06/2020 -31/05/2023 363.000 €
- 5 Experimental Studies of Exotic Nuclear Structure (O. Tengblad) FPA2015-646969-P. (IEM - CSIC). 01/01/2016-31/12/2019. 350.000 €.
- 6 PASPAG JRA1 ENSAR2 (O. Tengblad) EU HORIZON2020. (IEM - CSIC). 01/03/2016- 28/02/2020. 100.000 €.
- 7 Dynamics and structure of light exotic nuclei. CALIFA-DB1 a demonstrator R3B. (O. Tengblad) FPA2009-07387. (IEM - CSIC). 2010-2013. 728.299 €.