

DATE	8/3/2020
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Part A. Personal Information

Surname(s)	BUENO VILLAR	
Forename	ANTONIO	
Researcher numbers	WoS Researcher ID (*)	F-3875-2015
	SCOPUS Author ID(*)	7102937391
	Open Researcher and Contributor ID (ORCID)	0000-0002-7439-4247

A.1. Current position

Post/ Professional Category	Full Professor	
UNESCO Code	220807	
Key Words	Ultra-high energy cosmic rays, neutrinos, astroparticle physics	
Name of the University/ Institution	Department/Center	Física Teórica y del Cosmos, Facultad de Ciencias
	Full Address	Avda. Fuente Nueva s/n, 18071 Granada
	Email Address	a.bueno@ugr.es
	Phone Number	+34 958 24 32 00
	Start date	3/1/2012

A.2. Education (*title, institution, date*)

1990	University of Granada	University Degree	Physics
1991	University of Granada	Master	Physics
1994	University of Valencia	PhD	Physics

A.3. Indicators of Quality in Scientific Production (*See the instructions*)

<ul style="list-style-type: none"> - Publications (data from Scopus): 169; total citations: 10226 - Average of total citations/year (last five years): 840 citations - Average citations/paper (last five years): 24 citations - h index: 49 - 8 supervised Ph.D. theses. - 22 talks in international conferences. - 4 “sexenios” (a “sexenio” is a 6-year period of high-quality scientific production; last period granted by the Spanish Agency for the Assessment of Scientific Quality: 2010-2015).

Part B. Free Summary of CV (*Max. of 3.500 characters, including spaces*)

<p>My scientific career started as a Ph.D. student in the IFIC group (Valencia). Supervised by Professor J. Velasco, I participated in the experiment UA4/2. Using data from proton-anti-proton collisions at an energy $\sqrt{s}=541$ GeV, my thesis shows that the ratio between the real and imaginary parts of the forward scattering amplitude does not have an abnormal value and therefore the model of odderons is discarded. My thesis also made predictions for the</p>
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value of the p-p cross-section at the LHC energies. My thesis gave rise to three articles that have nowadays nearly 250 citations. I got a two-year postdoctoral fellowship to join the Harvard University group working in the NOMAD neutrino experiment. I contributed to the construction and commissioning of the hadronic calorimeter. I worked in the analysis searching for oscillations of muon neutrinos to tau neutrinos using events quasi-elastic (simple topologies that present end states with a maximum of three traces reconstructed). This analysis has a high efficiency of selection and constituted an important addition to the standard NOMAD analysis (initially based only on deep inelastic collisions). During a campaign of data taking, I was nominated Run Coordinator of NOMAD.

I also enjoyed a five-year postdoctoral fellowship at the ETH Zürich. I continued my participation in the NOMAD experiment. We got the oscillation analysis with better sensitivity for the emergence of neutrinos of tau, in which the tau lepton disintegrates to pions. Simultaneously we collaborated in the construction of the liquid argon ICARUS detector. I was responsible for developing all the software for data acquisition and reconstruction. We got to operate successfully for the first time a large-mass liquid argon TPC. Our data sample of cosmic rays showed that this detector is ideal for studying neutrino properties.

In 2002 I arrived at the University of Granada. I am the founder of the high-energy physics experimental group. I have always acted as PI of the group. Initially our activities focused on developing the entire system of slow control of experiment ArDM (a ton liquid-argon TPC designed to perform direct searches of dark matter). We developed all the simulation and reconstruction software. These activities gave rise to three doctoral theses.

In 2006 the group joined the Pierre Auger Observatory. We have studied the composition of cosmic rays of ultra-high energy. We have demonstrated for the first time that it is experimentally feasible to estimate the composition using the arrival times of the muons registered by the detector surface. This line of innovative research, not used in the field before, has given rise to three doctoral theses. Two additional Ph.D. theses have been completed on different subjects. For two years I was co-leader of the Auger physics group focused on the study of the mass composition. I was the co-spokesperson of the Auger Observatory for four years.

Other merits: Member of the Scientific Committee of the SPS at CERN. Member of the Scientific Committee of the Laboratory of Canfranc (Spain). Spanish representative in APPEC (European Consortium for Astroparticle Physics). I belonged for five years to the Editorial Board of the European Physics Journal Plus and ISRN High Energy Physics.

Part C. Accomplishments (*Order by typology*)

C.1. Publications

Title: Multi-messenger Observations of a Binary Neutron Star Merger

Authors: Abbott, B. P.; et al.

Journal: Astrophysics J. Volume: 848 L12 Published: 2017

Citations (Inspire): 986; DOI: 10.3847/2041-8213/aa91c9

Title: Observation of a Large-scale Anisotropy in the Arrival Directions of Cosmic Rays above 8×10^{18} eV

Authors: Aab, A.; Abreu, P.; Aglietta, M.; et al.

Journal: Science Volume: 357 6537 Published: 2017

Citations (Inspire): 112; DOI: 10.1126/science.aan4338

Title: Inferences on mass composition and tests of hadronic interactions from 0.3 to 100 EeV using the water-Cherenkov detectors of the Pierre Auger Observatory

Authors: Aab, A.; et al.

Journal: Phys. Rev. D Volume: 96 122003 Published: 2017

Citations (Inspire): 48; DOI: 10.1103/PhysRevD.96.122003

Title: Muons in air showers at the Pierre Auger Observatory: Measurement of atmospheric production depth
Authors: Aab, A.; Abreu, P.; Aglietta, M.; et al. Journal: Physical Review D Volume: 90 (1) Published: 2014
Citations (Inspire): 105; DOI: 10.1103/PhysRevD.90.012012

Title: Interpretation of the depths of maximum of extensive air showers measured by the Pierre Auger Observatory
Authors: P. Abreu et al. Journal: Journal of Cosmology and Astroparticle Physics Volume: 2 Published: 2013
Citations (Inspire): 104; DOI: 10.1088/1475-7516/2013/02/026

C.2. Research Projects and Grants

-Title: PARTICLE AND ASTROPARTICLE PHYSICS AT THE UNIVERSITY OF GRANADA (SOMM17/6104/UGR)

Funding Agency: JUNTA DE ANDALUCÍA. Participants: UNIVERSIDAD DE GRANADA. Period: 2018-2020. P.I.: A. BUENO (UNIVERSIDAD DE GRANADA)

-Title: ESTUDIO DE LAS PROPIEDADES DE LOS RAYOS CÓSMICOS Y DE LOS NEUTRINOS EN LA UGR (FPA2017-85197-P)

Funding Agency: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD. Participants: UNIVERSIDAD DE GRANADA. Period: 2017-2019. P.I.: A. BUENO (UNIVERSIDAD DE GRANADA)

-Title: PARTICIPACIÓN DE LA UNIVERSIDAD DE GRANADA EN EL EXPERIMENTO AUGER Y SU FUTURA MEJORA AUGERPRIME (FPA2015-70420-C2-2-R)

Funding Agency: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD. Participants: UNIVERSIDAD DE GRANADA. Period: 2016-2017. P.I.: A. BUENO (UNIVERSIDAD DE GRANADA)

-Title: PARTICIPACIÓN DE LA UGR EN EL OBSERVATORIO PIERRE AUGER (FPA2012-39489-C04-04)

Funding Agency: MINISTERIO DE ECONOMIA Y COMPETITIVIDAD. Participants: UNIVERSIDAD DE GRANADA. Period: 2013-2015. P.I.: A. BUENO (UNIVERSIDAD DE GRANADA)

-Title: FISICA EXPERIMENTAL DE RAYOS COSMICOS (EL OBSERVATORIO PIERRE AUGER) E I+D PARA FISICA SUBTERRANEA EN CANFRANC (FPA2009-07187)

Funding Agency: MINISTERIO DE CIENCIA E INNOVACION. Participants: UNIVERSIDAD DE GRANADA. Period: 2009-2012. P.I.: A. BUENO (UNIVERSIDAD DE GRANADA)

C.3. Organization of Scientific Activities

Title: Open Symposium on the Update of the European Strategy for Particle Physics; Activity: Chair organizing committee. Scope: International. Date: 13-16, May 2019, Granada.

Title: XLV International Meeting on Fundamental Physics; Activity: Co-organizer. Scope: International. Date: 24-28, April 2017, Granada.

Title: IV Jornadas CPAN; Activity: Co-organizer. Scope: National. Date: 26-28, November 2012, Granada.

Title: IDPASC Neutrino School; Activity: Co-organizer. Scope: International. Date: 24-27, October 2012, Granada.

Title: XLII International Symposium on Multiparticle Dynamics; Activity: Convener of the neutrino session. Scope: International. Date: 17-21, September 2012, Kielce, Polonia.

C.4. Participation in Scientific Committees, International Boards

Member of the SPS Scientific Committee. Host institution: CERN. Activity: Referee of the experiments that belong to the Neutrino Platform Program. Date: January, 2015 – January, 2018.

Member of the Scientific Committee of the Canfranc Laboratory; Host institution: Laboratorio Subterráneo del Canfranc. Activity: Scientific Advisor. Date: July, 2013 – still in office.

International representation: Co-Spokesperson of the Pierre Auger Observatory; Date: November, 2013 – November, 2017.

International representation: Spanish representative in APPEC; Date: March 2016 – still in office

C.5. Editorial Boards in Peer-Reviewed Journals

Member of the Editorial Boards: The European Physical Journal Plus. Date: August, 2010-August, 2015; ISRN High Energy Physics. Date: September, 2011- September, 2015.