José Nicolás Orce (Full Professor)

Fundamental Nuclear Physics and Applications

Address: Department of Physics & Astronomy, University of the Western Cape , Cape Town, South Africa
Phone: +27 21-959-3454 (office) Email: jnorce@uwc.ac.za /nico.orce@cern.ch
Born: 01/10/1972, Almuñécar (Spain) Marital Status: Married
Website: https://nuclear. uwc.ac.za YouTube: https://www.youtube.com/c/NicoOrce
h-index / 10-index: 20 / 37 (Google Scholar) NRF Rating: B (2017)
Peer-reviewed publications: 100 + Grant secured funds: +2.75 Million EUR

EDUCATION / CAREER

- **Licenciatura (5 Years Degree) in Fundamental Physics** (1993 -1999)
  University of Granada (Granada, Spain)
- **Electronics Engineering** (1999) Electromagnetic Pulse (EMP), Nuclear Origin and Effects in Electronic Devices (Shielding Theory), Universidad de Granada (Granada, Spain)
- **Ph.D. in Experimental Nuclear Physics** (2000 - 2003)
  "Multi-quasiparticles and shape-driving effects in ^{128}Xe, ^{127}I and ^{125}Sb", University of Brighton (Brighton, East Sussex, UK)
- **Postdoctoral Scholar** (2003 - 2006)
  University of Kentucky, Lexington (Kentucky, USA)
- **Research Associate** (2006 - 2007)
  University of Kentucky, Lexington (Kentucky, USA)
- **Assistant Professor** (2007)
  Eastern Kentucky University, Richmond (Kentucky, USA)
- **Postdoctoral Research Fellow at TRIUMF** (2008 – 2010)
  Canadian National Facility for Nuclear and Particle Physics (Vancouver, Canada)
- **Lecturer in Physics** (2011-2012)
  Physics Department, University of the Western (Cape Town, South Africa)
- **Associate Professor in Physics** (2012-2016)
  Physics Department, University of the Western Cape (Cape Town, South Africa)
- **Full Professor in Physics** (2017-2021)
  Physics & Astronomy Department, University of the Western Cape (Cape Town, South Africa)

INVITED TALKS & SEMINARS (2018-2021)

- **Recent Issues with 3N forces, Nuclear Clusters and Shell Model,** International Conference on Recent Issues in Nuclear and Particle Physics (RINP2), Visva-Bharati University, Santiniketan, India (2019).
- **How do we Infer Shell Effects @ High-Excitation Energies?** International Conference on Nuclear Structure and Dynamics (NSD), Venice, Italy (2019).
- **Coulomb-excitation studies @ iThemba LABS,** ANSTT2 Workshop, iThemba LABS (2019).
- **Nuclear Polarizability Effects in Coulomb-Excitation Studies of Light and Medium-Mass Nuclei,** 3rd GOSIA Workshop, Heavy Ion Laboratory, University of Warsaw, Warsaw, Poland (2018).
- **Review of SA Physics at ISOLDE from UWC's Perspective.** SA-CERN 10-Year Celebration (2018)
- **Nuclear Polarizability Effects @ Low Excitation Energies.** The 6th International Conference on Collective Motion in Nuclei under Extreme Conditions (COMEX6), Cape Town (2018).
- **Breaking Heavens Code: How Were/Are the Elements Made?** XIII (2018) and Xth (2020) Tastes of Nuclear Physics.
- **Synergy between Nuclear Physics and SKA,** Mini-Workshop on Gravitational Waves, Radio Astronomy and Nuclear Physics, SKA-SALT-Nuclear Collaboration Meeting, UWC (2018).
- **When Atomic Nuclei Polarize.** Isospin, STructure, Reactions and energy Of Symmetry (ISTROS), Slovakia (2018).
- **Colloquia, Webinars & Lectures given at** Panjab University (India), iThemba LABS (SA), University of Cape Town (SA), Instituto de Física Corpuscular (IFIC, Valencia), TRIUMF (Canada), Nelson Mandela University (SA), Cambridge University (UK), CERN (Switzerland), University of York (UK), NITheCS (SA), University of Notre Dame (USA).
- **Presentations given by my Students and Postdocs:** S Masango (2xISOLDE Workshop, CAGRA Workshop, Japan, Tastes, SAIP), K Abrahams (2xISOLDE Workshop, SAIP, ANSTT2, Tastes), C Ngwewtsheni (SAIP, ANSTT2, Tastes, iThemba LABS, RINP2, India, Hyperfine Interactions, India), K Kapoor (Hyperfine Interactions, India, Tastes), B Lomberg (First Stars, Brazil, Tastes, ANSTT2), M Mokgolobotho (SAIP, Tastes, 4th SA-JINR, Dubna), C Mehl (Nuclear Structure 2016, USA, iThemba LABS, 4th SA-JINR, Dubna), N Bernier (Tastes), K Raju (4th SA-JINR, Dubna, DAE-BRNS, India, SAIP). E Akakpo and D Mavela (Tastes of Nuclear Physics, South African Institute of Physics),

TEACHING & LEARNING

- ASTRONOMY 192, Stars, Galaxies and the Universe (University of Kentucky, Summer 2006).
  Complete course responsibility: lecturing, writing examinations, assigning course grades.
  Course Evaluation: 3.4/4.
- ASTRONOMY 130, In Quest of the Universe (Eastern Kentucky University, Spring 2007).
  Complete course responsibility: lecturing, writing examinations, assigning course grades.
  No evaluation.
- PHYSICS 231: Classical Mechanics and Waves (University of Kentucky, Summer 2007).
  Complete course responsibility: lecturing, writing examinations, assigning course grades.
  Course Evaluation: 3.1/4.
- Teaching at the University of the Western Cape:
  1. PHY312 (3rd year): Quantum Mechanics and Nuclear Physics (2011-2019).
  2. PHY322 (3rd year): Energy (2013).
  3. Nuclear Structure Physics (MaNus Honours) (2011-2020).
  4. Computer Skills (2011-2021).
  5. Statistical Physics / Honours (2018).
  6. PHY111 (1st year): Introductory Physics (2020-21).
     Videos of the Lectures @ https://www.youtube.com/c/NicoOrce
- Mini-Schools on Mathematical Modelling of Covid-19, Coulomb excitation, etc.

RESEARCH

- Nuclear Physics Experiments carried out during 2016-2019:
  Experiments carried out at iThemba LABS (Coulomb-excitation campaign April-May 2016)
  Leading experiment at HIE-ISOLDE (CERN) ran in July 2017.
  Leading experiment at TRIUMF (Vancouver Canada) in July 2018.
  First Coulomb-excitation of 12C using high-intense beams at Maier-Leibniz-Laboratory (Munich) ran in May 2018.
  First GAMKA experiment ran successfully at iThemba LABS in October 2019.
  Development of the Modern African Nuclear DEtector LAboratory at UWC (to be commissioned in 2020).
- Other Nuclear Physics Experiments and Astronomy observations carried out previously at:
  The Australian National University, GANIL, Yale University, University of Notre Dame, University of Cologne, Duke University, University of Kentucky, Universität Stuttgart, TRIUMF, Argonne National Laboratory, University of Washington, iThemba LABS, HIE-ISOLDE/CERN and SALT (astronomy of metal-poor stars).
- Referee
  Physical Review C (American Physical Society), Journal of Physics G (Institute of Physics), European Journal of Physics A (Springer), EPJ Web of Conferences (Springer), SAIP (South African Institute of Physics), Canadian Journal of Physics.
- MSc and PhD Thesis Examiner.
  J Easton (MSc, UWC), SS Ntshangase (PhD, UCT), MA Stankewicz (PhD, UCT), PL Masiteng (PhD, UWC), S Bvumbi (PhD, UJ), BV Kheswa (PhD, SU), K Lee (PhD, SU), B Zikhali (MSc UniZulu), SH Mthembu (MSc, UniZulu).
- Member of the Program Advisory Committee at iThemba LABS (2016-17).
- Chair of Physics Users at iThemba LABS (2016-17).
- Chair of the Tastes of Nuclear Physics (2011-2020): 9th edition hosted at the University of Zululand (~150 attendees).
  Videos of the Talks @ **https://www.youtube.com/c/NicoOrce**

PI RESEARCH GRANTS (TOTAL >R50M = €2.75M)

- Spokesperson and Grant Holder for GAMKA: NRF Strategic Research Equipment (>**R35M**)
  https://www.nrf.ac.za/media-room/news/nrf-funds-state-art-nuclear-spectrometer-uwc
- UWC's GAMKA Related Research (R250k) , Prestige Postdoc (R500k) and Equipment Funds (250k)
- NRF Program for Competitive Rated Researchers (R800k)
- NRF/DST Conference Funds: IX Tastes of Nuclear Physics @ UniZulu (R800k)
- NRF Travel + KIC Funds: TRIUMF experiment + International Visitors (R120k)
- Global Challenge Research Funds/ Science & Technology Facilities Council in the UK (MANDELAb Phase 1, ~**R2M**)
- Global Challenge Research Funds/ Science & Technology Facilities Council in the UK (MANDELAb Phase 2, ~**R10M**)
- SA-CERN Collaboration: Trips to CERN, visitors, equipment (~R300k)
- Company Funders: XIA Digital Electronics (USA), MICRON Semiconductors (UK), Bio-Teknik, Netcare Hospitals.

Student Supervision

- **20 Graduated Students in the last 5 years (4 PhD, 14 MSc, 4 Postdocs):** T Dinoko (PhD, 2013), NA Khumalo (MSc 2014), N Erasmus (MSc 2014), CV Mehl (MSc, 2015), B. Singh (MSc, 2016), Kumar Raju (Postdoc, 2014-2016), MJ Mokholobotho (MSc, 2017), K Sowazi (MSc, 2018), T Nogwanya (MSc, 2018), S Masango (MSc, 2019), C Ngwetsheni (MSc, 2019), E Akakpo (MSc, 2019), N Kheswa (PhD, 2019), E Martin Montes (MSc 2019), LD Mavela (MSc, 2019), L Davis (MSc, 2019), GG O'Neill (Postdoc, 2016-2018), K Kapoor (2018-2019), N. Radebe (MSC,2021), K Abrahams (PhD, 2021), C Mehl (PhD, 2021).
- **Current Students/Postdocs under my direct supervision (5 PhD, 4 MSc):** T Nogwanya (PhD), S Masango (PhD), C Ngwetsheni (PhD), B Lomberg (PhD), E Akakpo (PhD), N Radebe (MSc), A Zulu (MSc), B Lesch (MSc), RA Madonsela (MSc)., N Bernier (Postdoc), TD Bucher (Postdoc), K Abrahams (Postdoc).
- **Alumni**: MJ Mokholobotho (Machine Learning, Joburgh), K. Kapoor (TRIUMF postdoc), LD Mavela (High-school teacher in the Gramstowns), K. Raju (Postdoc in Japan and China), NA Khumalo (NMR), TS Dinoko (NMR), N Erasmus (IT), K Sowazi L Davis (NRG, Netherlands),
- **Student Exchange Programs at University of York, TRIUMF, CERN, Imperial College London, University of Kentucky.**

Selected peer-reviewed Publications (>100 total)

- JE Amaro, J Dudouet & JN Orce, Applied Mathematical Modelling **90**, 995 (2021); selected as Elsevier Public Health Emergency Collectiton. Impact Factor: **3.633**
- J. N. Orce, International Journal of Modern Physics E Vol. 29, No. 03, 2030002 (2020)
  Top 2020 Most Read Articles and selected as long-standing value for the last 30 years.
- C. Ngwetsheni and J.N. Orce, Physics Letters B **792**, 335 (2019). Impact Factor: **4.384**
- P. E. Garrett *et al.*, Physical Review Letters **123**, 142502 (2019). Impact Factor: **9.227**
- M. Kumar Raju, JN Orce *et al.*, Physics Letters B **777**, 250 (2018). Impact Factor: **4.384**
- Publications by my students, P. Butler, L.P. Gaffney, P. Spagnoletti, J. Konki, M. Scheck, J.F. Smith, K. Abrahams *et al.*, Nature Communications (2019). Impact Factor: **12.353;** P. Butler *et al.*, Phys. Rev. Lett. **124**, 042503 (2020).
- More Publications **@** Nico Orce Google Scholar Citations

Outreach & Media

- CERN Beam Time for Schools, Cedar House (Cape Town)
- THOPE Foundation and Zola School in Khayelitsha (Cape Town)
- Chair of the UWC Research Open Day (Plenary talks by Physics Nobel Laurate Serge Haroche)
  https://www.youtube.com/watch?v=-ipl6CLiLnc
- Schools in KwaZulu-Natal
- Senamile Masango Foundation for Women in Science (S Masango, UWC Ambassador)
- Supporting HDIs with state-of-the-art nuclear lab, conferences and international collaborations (CERN, TRIUMF).
- Building Role Models **@** UWC: Lots of media coverage for our students (C Ngwetsheni, C Mehl, S Masango, K Abrahams, E Akakpo, K Kapoor, N Kheswa, etc)
- https://home.cern/news/news/experiments/ubuntu-powerful-motto-important-experiment
- http://theconversation.com/africas-universities-can-shrug-off-history-and-stage-science-revolutions-65284
- https://www.pressreader.com/south-africa/cape-times/20191009/281689731563707
- https://www.pressreader.com/south-africa/zululand-observer/20191004/281857235276418
- For much more information Google: Nico Orce + Students + CERN + TRIUMF + Nuclear + Tastes

References

- Prof Steven Yates (University of Kentucky USA): yates@uky.edu
- Dr Gordon Ball (TRIUMF, Canada): ball@trium.ca
- Prof David Jenkins (University of York, UK): david.jenkins@york.ac.za
- Prof Alison Bruce (University of Brighton, UK): alison.bruce@bton.ac.za
- Prof John L Wood (Georgia Tech): john.wood@physics.gatech.edu
- Prof Peter Butler (University of Liverpool): peter.butler@liverpool.ac.uk
- Prof Sifiso Ntshangase (University of Zululand): sifiso.mgazi@gmail.com
- Prof Krish Bharuth-Ram (University of KwaZulu-Natal): kbr@saao.ac.za)
- Prof Maria Jose Garcia Borge (CERN): maria.garcia.borge@cern.ch
- Prof Gerda Neyens (CERN): gerda.neyens@cern.ch
- Dr Karl Johnston (CERN): karl.johnston@cern.ch
- Prof Jens Dilling (TRIUMF): jdilling@triumf.ca