

JOSEBA ALONSO

Institute for Molecular Instrumentation and Imaging, Polytechnic University of Valencia – Spain
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Academic Record

- Sep. 2003 – Mar. 2007
PhD (magna cum laude) in experimental atomic physics at Johannes Gutenberg Universität Mainz – Germany
Supervisors: Prof. G. Werth, Prof. H.J. Kluge and Prof. K. Blaum
Thesis title: Development of an Experiment for Ultrahigh-Precision g-Factor Measurements in a Penning-Trap Setup
- Sep. 2002 – Sep. 2003
Master's degree (cum laude) in experimental atomic physics at Johannes Gutenberg Universität Mainz - Germany
Supervisors: Prof. G. Werth and Prof. H.J. Kluge
Thesis title: Axial temperature of a single hydrogenic carbon ion in a Penning trap
- Sep. 1999 – Jun. 2003
Physics degree at Universitat de València – Spain
- Sep. 1996 – Sep. 1999
Telecommunication engineering at Universidad Politécnica de Valencia – Spain
Over 100 ECTS credits – moved on to Physics for vocational reasons

Research Positions

- Principal investigator (Mar. 2018 – Present)
Magnetic Resonance Imaging Laboratory (MRILab)
Inst. for Molecular Instrumentation and Imaging (i3M), Polytechnic University of Valencia
- Senior research assistant (Apr. 2016 – Feb. 2018)
ETH Zurich – Switzerland
Principal investigator: Prof. Jonathan Home
- Post-doctoral researcher (Mar. 2011 – 2016)
ETH Zurich – Switzerland
Principal investigator: Prof. Jonathan Home
- Consultant / Trainer / Manager (Apr. 2007 – Feb. 2011)
MetaForum S.L., Valencia - Spain
- Part-time Programmer / Engineer (Mar. 2003 – Mar. 2007)
Stahl-Electronics, Mettenheim – Germany

Professional Experience

- Referee for various scientific journals including Physical Review Letters, New Journal of Physics, Journal of Physics B, Physica Scripta, Review of Scientific Instruments, Journal of Applied Physics
- Senior scientific consultant for the Spanish Ministry of Economy and Competitiveness (Mineco - ANEP) – 12 project evaluations in 2016

- Senior scientific consultant for the Netherlands Organization for Scientific Research (NWO) – 1 project evaluation in 2017
- Member of Scientific Committee for 25th Central European Workshop on Quantum Optics (CEWQO 2018)

Stipends and Awards

- Best contribution at the Workshop on Quantum Systems and Technology held at Monte Verità in Ascona, Switzerland (2015)
- Doctoral stipend from GSI-Darmstadt (2003-2007)
- Marie Curie stipend from European Union (2003-2004)
- IV Summer Program from SEACAVA e.V. (2001)

Teaching experience

- Lecturer at ETH – Cavity QED and Ion trap physics (SS 2017)
- Teaching assistant at ETH – Cavity QED and Ion trap physics (SS 2015)
- Teaching assistant at ETH – Advanced Praktikum (5 semesters between 2011-2016)
 - Advanced laboratory on analog electronics
 - Superconductivity
 - Photo-electric effect
- Teaching assistant at ETH – Physics III (5 semesters between 2011-2018)
 - Optics, introductory quantum mechanics, statistical physics, atomic physics
 - Creation of weekly problem sets
 - Coordination of teaching assistants (10-15)
 - Replacement for Prof. Jonathan Home at some lectures
 - Creation and marking of exam problems
- Vocational trainer in MetaForum (2007-2011)
 - Over 1000 hours in classrooms for over 50 customers
 - Topics taught: management, business operations, processes & procedures, quality assessment, teaching techniques, interpersonal and communication skills, technology & computing
 - Installation of more than 10 e-learning platforms (Moodle) for large customers
 - Responsible of e-learning platform with over 100 courses and 2000 inscriptions
 - Creation of video-based e-learning Excel courses
- Teaching assistant at Mainz University (2005-2006)
 - Atomic physics (2005)
 - Introductory physics for biologists (2005-2006)
- Private teaching (1994-2002)

Supervised students and scientists

- Summer and semester students: Dominik Wild (2011), Tadas Kartanas (2012), Felix Krauth (2013), Ludovic Scyboz (2014), Roland Matt (2015), Peng Zhou (2016), Vilasini Venkatesh (2016), Shreyans Jain (2017), Igor Pogorelov (2017)
- Master's students
 - Roland Hablützel (2011-2012): Novel atom sources and ultra-fast electronic switches for trapped-ion quantum-information experiments
 - Matteo Fadel (2012-2013): Cryogenic setup for fast manipulation of the quantum motional states of trapped ions
 - Chi Zhang (2014-2015): CMOS fabrication for scalable trapped-ion quantum information processing
 - Roland Matt (2016): Ion-trap design for magnetic-field-driven quantum information processing
 - John McCann (2016-2018)
 - Peng Zhou (2017-2018)
 - Shreyans Jain (2017-2018)
 - Martin Woschank (2017-2018)
 - Andrei Militaru (2017-2018)
- Engineers
 - Eduardo Pallás (2018-present)
 - Miguel Corberán (2018-present)
 - Guillermo Puchalt (2018)
- PhD students:
 - Florian Leupold (2011-2015): Bang-bang control of a trapped-ion oscillator
 - Ursin Solèr (2014-2015)
 - Chi Zhang (2015-present)
 - Maciej Malinowski (2015-present)
 - Robin Oswald (2016-present)
 - Roland Matt (2017-present)
 - Daniel Grau (2018-present)
 - José Manuel González (2018-present)
- Postdocs
 - Florian Leupold (2015-2017)
 - José Miguel Algarín (2018-present)
 - Juan Pablo Rigla (2018-present)
 - Elena Díaz (2018-present)
- PhD evaluation committees:
 - Sofía Martínez Garaot, Universidad del País Vasco, Bilbao – Spain (2016)

Participation in projects

- In situ imaging of living tissues with cellular spatial resolution (HISTO-MRI)
EU Horizon 2020 – FET-OPEN program
<http://www.histo-mri.i3m.upv.es/>
Grant: 3.2 M€
Role: Scientific coordinator
- Encoded Qubit alive (eQual)
Intelligence Advanced Research Projects Activity (IARPA) – LogiQ program
<https://www.iarpa.gov/index.php/research-programs/logiq>
Grant: 12 M\$
Role: Researcher
- Ultra-fast control of trapped ions
COST-IOTA – Research project
http://www.cost.eu/COST_Actions/mpns/Actions/MP1001
Grant: 180 kCHF
Role: Applicant and researcher
- Quantum computing with trapped electrons (QUELE)
FP6-IST, FET – Open, STREP
http://cordis.europa.eu/project/rcn/71907_en.html
Grant: 1.4 M€
Role: Applicant and researcher
- Researcher in the European research networks HITRAP, NIPNET, ION-CATCHER, FLAIR, FAIR, QSIT and COST-IOTA

Invited talks (reverse chronological order)

International conferences:

- “Non-classical correlations in an indivisible quantum system”
International Conference on Quantum Simulation & Computation, Bilbao – Spain (2018)
- “Quantum contextuality tests with a trapped-ion qutrit”
XV Int. Conf. on Quantum Optics and Quantum Information, Minsk – Belarus (2017)
Workshop on trapped-ion experiments and foundations of quantum theory, Granada – Spain (2017)
Quantum Nanophotonics Conference, Monte Verità – Switzerland (2017)
- “Continuous generation of contextual correlations with 50 million sequential measurements”
Solstice of quantum foundations workshop, Zurich – Switzerland (2017)
- “Fast quantum control and light-matter interactions at the 10,000 quanta level”
XIV Int. Conf. on Quantum Optics and Quantum Information, Minsk – Belarus (2015)
- “Diabatic manipulation of the quantum motional states of trapped ions”
Shortcuts to adiabaticity, Shanghai – China (2014)
- “A miniature electron-beam ion source for in-trap creation of highly charged ions”
International conference on ion sources, Caen - France (2005)
- “g-factor measurements on hydrogen-like ions as a test of bound-state QED”
HITRAP/NIPNET/IONCATCHER joint meeting, Munich - Germany (2005)

Universities and research institutes:

- “Non-classical correlations in an indivisible quantum system”
Korea Institute for Advanced Study, Seoul – South Korea (2017)
- “Quantum technologies based on trapped ions”
CSIC and Universidad Politécnica de Valencia – Spain (2017)
- “Quantum control with trapped ions”
Universitat de les Illes Balears – Spain (2017)
- “Cryogenic surface-electrode traps at ETH Zurich”
Gottfried Wilhelm Leibniz Universität Hannover – Germany (2017)
MIT Lincoln Laboratories, Massachusetts – USA (2017)
Duke University, North Carolina – USA (2017)
Joint Quantum Institute, Maryland – USA (2017)
NIST Boulder – USA (2017)
University of California Berkeley, California – USA (2017)
- “Unconventional control of quantum systems with ion traps”
Johannes Gutenberg Universität, Mainz – Germany (2016)
- “Fast quantum control and light-matter interactions at the 10,000 quanta level”
Universidad del País Vasco, Bilbao – Spain (2015)
- “Towards ultra-fast quantum control of the motional states of trapped ions”
Max Planck Institute for Nuclear Physics, Heidelberg – Germany (2012)
ETH, Zurich – Switzerland (2012)
- “Ion Trapping at ETH Zurich”
Prof. Rainer Blatt’s annual group meeting, Obergurgl – Austria (2011)
- “g-factor measurements on hydrogen-like ions as a test of bound-state QED”
Universidad de Vigo - Spain (2010)
ETH, Zurich – Switzerland (2010)

- “Extending g-factor measurements to heavy, highly-charged ions”
University of Mainz - Germany (2007)
- “Ion traps as an ideal tool for ultra-high precision experiments in nuclear and atomic physics”
University of Valencia - Spain (2006)
University of Mainz - Germany (2006)

Publications (reverse chronological order)

Statistics from Google Scholar:

- Number of citations: 693
- h index: 17

1. **“Energy consumption for ion transport in a segmented Paul trap”**
A Tobalina, J Alonso, JG Muga
New Journal of Physics 20, 065002 (2018)
2. **“Probing the limits of correlations in an indivisible quantum system”**
M Malinowski, C Zhang, FM Leupold, A Cabello, J Alonso, JP Home
arXiv: 1712.06494 (2017), submitted to Physical Review A
3. **“Sustained state-independent quantum contextual correlations from a single ion”**
FM Leupold, M Malinowski, C Zhang, V Negnevitsky, A Cabello, J Alonso, JP Home
Physical Review Letters 120, 180401 (2018)
4. **“Multi-ion sensing of dipolar noise sources in ion traps”**
F Galve, J Alonso, R Zambrini
Physical Review A 96, 033409 (2017)
5. **“Generation of large coherent states by bang–bang control of a trapped-ion oscillator”**
J Alonso, FM Leupold, ZU Solèr, M Fadel, M Marinelli, BC Keitch, V, Negnevitsky, JP Home
Nature Communications 7, 11243 (2016)
6. **“Fast expansions and compressions of trapped-ion chains”**
M Palmero, S Martínez-Garaot, J Alonso, JP Home, JG Muga
Physical Review A 91, 053411 (2015)
7. **“Optimal electrode geometries for 2-dimensional ion arrays with bi-layer ion traps”**
FN Krauth, J Alonso, JP Home
Journal of Physics B: Atomic, Molecular and Optical Physics 48 (1), 015001 (2015)
8. **“Fast transitionless expansions of Gaussian anharmonic traps for cold atoms: Bang-singular-bang control”**
XJ Lu, X Chen, J Alonso, JG Muga
Physical Review A 89 (2), 023627 (2014)
9. **“All-solid-state continuous-wave laser systems for ionization, cooling and quantum state manipulation of beryllium ions”**
HY Lo, J Alonso, D Kienzler, BC Keitch, LE de Clercq, V Negnevitsky, JP Home
Applied Physics B 114 (1-2), 17-25 (2014)
10. **“Quantum control of the motional states of trapped ions through fast switching of trapping potentials”**
J Alonso, FM Leupold, BC Keitch, JP Home
New Journal of Physics 15, 023001 (2013)

11. **“Experimental g factor of hydrogenlike silicon-28”**
B Schabinger, S Sturm, A Wagner, J Alonso, W Quint, G Werth, K Blaum
European Physical Journal D-Atomic, Molecular, Optical and Plasma Physics 66, 3 (2012)
12. **“The anomalous magnetic moment of the electron in hydrogenlike ions”**
M Vogel, J Alonso, K Blaum, W Quint, B Schabinger, S Sturm, J Verdu, A Wagner, G Werth
European Physical Journal-Special Topics 163 (1), 113-126 (2008)
13. **“Towards a magnetic field stabilization at ISOLTRAP for high-accuracy mass measurements on exotic nuclides”**
M Marie-Jeanne, J Alonso, K Blaum, S Djekic, M Dworschak, U Hager, A Herlert, Sz Nagy, R Savreux, L Schweikhard, S Stahl, C Yazidjian
Nuclear Instruments and Methods in Physics Research Section A 587 (2), 464 (2008)
14. **“Towards a g-factor determination of the electron bound in highly-charged calcium ions”**
B Schabinger, J Alonso, K Blaum, G Werth, HJ Kluge, W Quint, M Vogel, S Stahl
Journal of Physics: Conference Series 58 (1), 121 (2007)
15. **“Highly charged ions, quantum-electrodynamics, and the electron mass”**
G Werth, J Alonso, T Beier, K Blaum, S Djekic, H Häffner, N Hermanspahn, W Quint, S Stahl, J Verdú, T Valenzuela, M Vogel
International Journal of Mass Spectrometry 251 (2), 152-158 (2006)
16. **“A miniature electron-beam ion source for in-trap creation of highly charged ions”**
J Alonso, K Blaum, S Djekic, HJ Kluge, W Quint, B Schabinger, S Stahl, J Verdú, M Vogel, G Werth
Review of scientific instruments 77 (3), 03A901 (2006)
17. **“Precision measurements with highly charged ions at rest: The HITRAP project at GSI”**
HJ Kluge, F Herfurth, T Beier, L Dahl, S Eliseev, S Heinz, O Kester, C Kozhuharov, G Maero, W Quint, the HITRAP Collaboration
International Journal of Mass Spectrometry 251, p. 266-272 (2006)
18. **“Penning trap measurement of the magnetic moment of the antiproton”**
J Verdú, S Kreim, J Alonso, K Blaum, S Djekic, W Quint, S Stahl, S Ulmer, M Vogel, J Walz, G Werth
Proceedings of the LEAP 2005 Conference, 796 (1), 260-265 (2005)
19. **“Towards electronic g-factor measurements in medium-heavy hydrogenlike and lithiumlike ions”**
M Vogel, J Alonso, S Djekic, HJ Kluge, W Quint, S Stahl, J Verdu, G Werth
Nuclear Instruments and Methods in Physics Research Section B235, 7-16 (2005)
20. **“Phase-sensitive measurement of trapped particle motions”**
S Stahl, J Alonso, S Djekic, HJ Kluge, W Quint, J Verdu, M Vogel, G Werth
Journal of Physics B: Atomic, Molecular and Optical Physics 38 (3), 297 (2005)
21. **“A planar Penning trap”**
S Stahl, F Galve, J Alonso, S Djekic, W Quint, T Valenzuela, J Verdú, M Vogel, G Werth
European Physical Journal D 32, 139-146 (2005)
22. **“HITRAP - A facility at GSI for Experiments on Stored and Cooled Highly Charged Ions at Rest”**
HJ Kluge, T Beier, K Blaum, M Block, L Dahl, S Eliseev, F Herfurth, S Heinz, O Kester, C Kozhuharov, T Kühl, G Maero, W Nörtershäuser, T Stöhlker, W Quint, G Vorobjev, G Werth, the HITRAP Collaboration
Conference Proceeding Frankfurt, Germany, p. 89-101 (2005)
23. **“Highly charged ions at rest: The HITRAP project at GSI”**
F Herfurth, T Beier, L Dahl, S Eliseev, S Heinz, O Kester, HJ Kluge, C Kozhuharov, G

- Maero, W Quint, the HITRAP Collaboration
Conference Proceeding Wako, Japan, Vol. 793, p. 278-290 (2005)
24. **“Trapping ions of hydrogen-like uranium: The HITRAP project at GSI”**
T Beier, L Dahl, HJ Kluge, C Kozhuharov, W Quint, the HITRAP Collaboration
Nuclear Instruments and Methods in Physics Research Section B 235, 473-478 (2005)
 25. **“Temperature measurement of a single ion in a Penning trap”**
S Djekic, J Alonso, HJ Kluge, W Quint, S Stahl, T Valenzuela, J Verdú, M Vogel, G Werth
European Physical Journal D 31, 451-457 (2004)
 26. **“Electron and positron cooling of highly charged ions in a cooler Penning trap”**
J Bernard, J Alonso, T Beier, M Block, S Djekić, HJ Kluge, C Kozhuharov, W Quint, S Stahl,
T Valenzuela, J Verdú, M Vogel, G Werth
Nuclear Instruments and Methods in Physics Research Section A 532, 224 (2004)
 27. **“Continuous Stern–Gerlach effect and the magnetic moment of the antiproton”**
W Quint, J Alonso, S Djekić, HJ Kluge, S Stahl, T Valenzuela, J Verdú, M Vogel, G Werth
Nuclear Instruments and Methods in Physics Research Section B 214, 207 (2004)
 28. **“The influence of the trapping potential on the attachment of a second electron to stored metal cluster and fullerene anions”**
A Herlert, R Jertz, J Alonso, AJ González Martínez, L Schweikhard
Int. J. Mass Spectrom. 218, 217-225 (2002)

Patents

1. **“Field emission source for electrons as a field emission cathode”**
C Trautmann, K Blaum, W Quint, B Schabinger, J Alonso, S Ulmer, F Maurer, J Brötz
EP Patent 2,130,211 / DE Patent 102,007,010,297 (2008)

Miscellaneous

- Languages: Spanish (native), English (excellent), German (good), French (basic), Catalan (excellent)
- Trained in Teaching techniques, Strategic management, Operational management and Business Scorecards in MetaForum
- Developer and implementer of multiple software tools for management of organizations and personnel
- Scientific outreach classes in primary and secondary schools between 2007 and 2011
- President of the Association of Valencian Students in Germany (SEACAVA) between 2005 and 2006
- Vocal of relationship with companies and institutions in SEACAVA between 2004 and 2005
- Organizer of the VI y VII Summer Programs from SEACAVA between the universities of Mainz and Valencia in 2003 and 2004