

Prof. Magdalena Kowalska

born on 22.09.1978 in Poznań, Poland, married with two children

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EDUCATION

- 2002 – 2006 **PhD studies in Physics**, laser spectroscopy and β -NMR of $^{29,31}\text{Mg}$, (supervisor prof. R. Neugart); Mainz University, DE
- 1997 – 2002 **M.S. studies in Physics**, femtosecond laser spectroscopy, Poznan University, PL
- 1997 – 2002 **M.S. studies in Management and International Relations**, Poznan U. of Economics, PL

RESEARCH EXPERIENCE AND EMPLOYMENT

- Oct18 – now **Assistant Professor at UNIGE** Department of Nuclear and Particle Physics and Principal Investigator of **ERC Starting-Grant** on Application of β -NMR to biology at CERN
- Oct15 – Sep18 **CERN Staff** in Experimental Physics Dept. and Principal Investigator of **ERC Starting-Grant** on Application of β -NMR to biology
- Oct10 – Sep15 **CERN Staff** in Physics Dept. and **ISOLDE Physics Coordinator**, ISOLDE-CERN, CH, laser spectroscopy and mass measurements of radioactive nuclei
- Jan10 – Sep10 **Marie Curie Fellow (Reintegration Grant)**, MPIK-Heidelberg, DE
Penning trap mass spectrometry and decay spectroscopy of radioactive nuclei
- Jan07 – Dec09 **Marie Curie Individual Fellow** and **CERN Fellow**, ISOLDE-CERN, CH
Penning trap mass spectrometry on radioactive nuclei
- Sep02 – Dec06 **Research and teaching assistant**, Mainz University, DE
Collinear laser- and β -NMR spectroscopy on radioactive nuclei at ISOLDE-CERN

APPROVED RESEARCH FUNDING

- 2019 – now **SNF Project** on NMR with hyperpolarised stable metal-ion beams
- 2018 – now **CERN Medical Applications Fund** (with R. Jolivet): gamma-MRI for medical diagnosis
- 2015 – now **ERC Starting Grant** (no 640645) on Application of β -NMR to biology
- 2010 **Marie Curie Reintegration Grant** on mass and decay spectroscopy of radioactive nuclei
- 2007 – 2009 **Marie Curie Individual Fellowship** on mass spectrometry of radio-nuclei

PRIZES, AWARDS, FELLOWSHIPS

- 2017 Selected to participate in STS forum Future Leaders Program in Kyoto, JP
- 2015 ERC Starting Grant, CERN, CH
- 2010 Marie Curie Reintegration Fellow, MPIK-Heidelberg, DE
- 2008 Selected to participate in Nobel Lindau Meeting in Physics, Lindau, DE
- 2007 Marie Curie Individual Fellow, CERN, CH
- 2007 CERN Senior Fellow, CERN, CH

OTHER FUNDING APPLICATIONS

- 2019 NCCR, CH, Physics of Biology, PI and responsible for the Training activities (results due in Aug19)
- 2019 FET-OPEN, gamma-MRI: revolutionary brain diagnostics; note 4.15/5 but not retained for funding, a resubmission is in preparation for September 2019

INSTITUTIONAL RESPONSIBILITIES

- Since 2016 Responsible for preselecting Polish summer students at CERN
- 2010 – 2015 ISOLDE-CERN Deputy Section Leader, responsible for 15 CERN staff members and 450 users and 50 projects per year
- 2010 – 2015 ISOLDE Laboratory Safety Officer

SUPERVISION OF JUNIOR RESEARCHERS

- Since 2010 3 postdoctoral researchers (S. Pallada, F. Wienholtz, S. Kreim)
- Since 2007 13 PhD students (project and thesis supervisor for K. Dziubinska-Kuehn, K. Kulesz, J. Croese, R. Harding, S. Pallada; CERN project supervisor: A. Welker, L. Grob, H. Tornqvist, M. Stachura, S. Naimi, M. Rosenbusch, M. Breitenfeldt, Ch. Borgmann, J. Stanja)
- Since 2007 4 master- (project and thesis supervisor: R. Engel (DPG Thesis Prize), M. Walczak; CERN project supervisor: D. Fink, Ch. Boehm) and 4 bachelor students (project and thesis supervisor: A. Javaji, P. Wagenknecht, M. Jankowski, A. Zhuravlova)
- Since 2002 16 summer interns

TEACHING ACTIVITIES

- Plan 2020 Introduction to physics for chemistry, earth-science and informatics students, UNIGE, CH
- 2019 Part of bachelor-level course on Modern Physics, UNIGE, CH
- 2019 Doctoral-level course on Radioactive Ion Beams, UNIGE, CH
- 2002 – now Lectures about CERN, ISOLDE, and nuclear physics to students and pupils visiting ISOLDE
- 2012 – 2016 CERN Summer Student Lectures on Nuclear Physics and the ISOLDE facility, CERN, CH
- 2014 One-week master-level course on nuclear physics at ISOLDE, Lyon, FR
- 2012 Lectures at CERN Accelerator School (Senec, SK) and School on Nuclear Physics (Bachino)
- 2002 – 2005 Mathematics courses for Mainz University students, Mainz, DE

MEMBERSHIPS IN BOARDS and REVIEWING ACTIVITIES

- 2019 Panel member for the Swedish Research Council; Stockholm, SE
- 2018 - now Scientific member of Programme Advisory Committee of ALTO facility; Orsay, FR
- 2017-2018 Member of International Advisory Committee for Colloque GANIL & Nuclear Structure 2018
- 2014-2017 Scientific member of SPSC (SPS & PS Experiments Committee); CERN, CH
- 2009-2015 Scientific Secretary of INTC (ISOLDE and Neutron Time of Flight Committee), CERN, CH
- Since 2015 Selection Committee Member for Research Staff positions at CERN and Vienna
- 2012 - now External Reviewer for NSERCC (Natural Sciences & Engineering Research Council of Canada)
- 2007 - now Referee for Phys. Rev. Lett., Phys. Rev. C, Phys. Lett. B, Nucl. Instr. Meth. A

ORGANISATION OF SCIENTIFIC MEETINGS

- 2020 Chair of Swiss NMR Symposium, CERN and UNIGE, CH
- 2018 International Conference on Electromagnetic Isotope Separators & Related Topics, CERN, CH
- 2017 Co-chair of CERN-UNIGE Workshop on Life Sciences, UNIGE, CH
- 2013, 2016 Intern. Workshops on Lasers & Storage Devices in the Atomic Nuclei Research, Poznan, PL
- Oct 2011 Organizer: Nuclear structure through ground-state properties of exotic nuclei, ECT* Trento, IT
- 2008 – 2017 ISOLDE Workshops and User Meetings, CERN, CH

ACTIVE MEMBERSHIP IN SCIENTIFIC SOCIETIES

European Physical Society

ORAL CONTRIBUTIONS TO INTERNATIONAL CONFERENCES

Invited presentations since 2012. (*Plus, since 2012, 17 conference talks and 14 invited talks at institutes*).

- Aug 2019 Berlin, DE: *International Nuclear Resonance Conference*, Ultrasensitive NMR with radionuclei
- Jul 2019 Glasgow, UK: *International Nuclear Physics Conference*, Applications of β -NMR in life sciences
- Jun 2019 Krakow, PL: *3rd Jagiellonian Symposium on Fundamental and Applied Subatomic Physics* (keynote talk), Versatile research with spin-polarized exotic nuclei
- Jun 2019 Zakopane, PL: (keynote talk), *International School and Symposium on Synchrotron Radiation in Natural Science*, β -NMR with CERN accelerators
- Sep 2018 Bologna, IT: *European Nucl. Phys. Conf (Plenary talk)*, β -NMR from nuclear physics to biology
- Apr 2018 Geneva, CH: *UNIGE physics colloquium*, Research with spin-polarized exotic nuclei
- Feb 2018 Bochum, DE: *DPG Tagung (Plenary talk)*, Nuclear techniques for chemistry and biology
- Feb 2018 Bormio, IT: *Nuclear Structure Workshop*, From nuclear physics to biology with β -NMR
- Aug 2017 Zermatt, CH: *UNIGE pharmacology graduate school: β -NMR & γ -MRI for biology & medicine*
- Sep 2017 Wroclaw, PL, *Polish Physicists Meeting*, From nuclear physics to biology with β -NMR
- Jun 2017 Geneva, CH: *CERN-UNIGE life sciences symposium*; β -NMR and metals in biology
- Jan 2017 Montreux, CH: *UNIGE life sciences graduate school*, β -NMR and metals in biology
- Jul 12-16 CERN, CH, *CERN Summer Student Lectures*, Nuclear physics and the ISOLDE Facility
- Sep 2015 Piaski, PL: *Mazurian Lakes Conference on Physics*, β -NMR: from nuclear physics to biology
- Jun 2015 Hohenroda, DE: *European Radioactive Ion Beam Conference*, The ISOLDE facility
- May 2014 Tokyo, JP: *Advances in Radioactive Isotope Science Conference*, β -NMR in liquids
- Jul 2013 Trento, IT: *ECT* workshop on Theoretical tools in support of infrastructures*, Atomic masses
- Jun 2013 Florence, IT: *International Nuclear Physics Conference*, Recent ISOLTRAP results
- Jul 2012 Bachino, BG: *Balkan Summer School on Nuclear Physics 2012*, The ISOLDE Facility
- Jun 2012 Senec, SK: *CERN Accelerator School*, Atomic Physics of Ion Sources

OUTREACH ACTIVITIES

Multiple presentations at schools in CERN area and in Poland about CERN and basic science, aimed at encouraging kids and teenagers (especially young girls) to consider STEM careers, e.g. within Swiss Tech Days (2017), Women in Science Day (2017-2019), Expand Your Horizons (2013, 2015, 2017).

Multiple presentations about CERN and Nuclear Physics to general public during CERN Open Days and during CERN visits, especially from Poland.

Many presentations and tours of the ISOLDE facility for students, teachers, other researchers, and VIPs (decision-makers, representatives of CERN member states).

Several articles about CERN and nuclear physics in general scientific interest magazines in Poland.

MAJOR COLLABORATIONS

G. Neyens, *KU Leuven, BE*: laser polarization and β -NMR for nuclear physics and fundamental studies

M. Madurga, *U Tennessee, USA*: β decay studies of spin-polarized nuclei and detector techniques

J-N. Hyacinthe, *HESGE, CH*: Xe hyperpolarisation and γ -MRI with long-lived nuclei for better diagnosis

M. Kozak, *Uni Poznan, PL*: biophysics, various spectroscopy techniques, including NMR

J. Plavec, *Uni Ljubljana, SI*, biochemistry, DNA structures, conventional NMR

T. Wesolowski, *UNIGE, CH*: calculations and interpretation of beta-NMR spectra

R. Jolivet, *UNIGE, CH*: γ -MRI for brain imaging

L. Fraile, J-M. Udias, *UCM Madrid, ES*, ES: B-field-compatible detectors for γ -MRI imaging

L. Hemmingsen and P.W. Thulstrup, *Uni Copenhagen, DK*: Biochemistry, spectroscopy, NMR techniques

K. Blaum, *MPIK Heidelberg, DE*: Mass spectrometry of short-lived nuclei; Laser spectroscopy and β -NMR on short-lived nuclei; radioactive-ion beam techniques; host of my MC Reintegration Grant

W. Nörtershäuser, *Uni Darmstadt, DE*: laser spectroscopy, β -NMR on radio-nuclei

D. Lunney, *CSNSM Orsay, FR*; L. Schweikhard, *Uni Greifswald, DE*: Mass spectrometry of radio-nuclei

PUBLICATIONS

89 peer-reviewed publications (79 articles, 16 proceedings, and 3 reviews), including (since 2012) 2 papers in *Nature*, 13 in *Phys. Rev. Lett.* and 5 in *Phys. Lett. B*. Cited over 2600 times, including 2340 without self-citation, Hirsch index 29 (Web of Science). Ten representative publications, chronologically:

V. Gins, R. D. Harding, M. Baranowski, M. L. Bissell, R. F. Garcia Ruiz, **M. Kowalska**, G. Neyens, S. Pallada, N. Severijns, Ph. Velten, F. Wienholtz, Z. Y. Xu, X. F. Yang, D. Zakoucky, **A new beamline for laser spin-polarization at ISOLDE**, *Nucl. Instr. and Meth. A* 925, 24 (2019); detailed technical paper on our new setup for laser polarisation

M. Kowalska, P. Aschenbrenner, M. Baranowski, M. Bissell, W. Gins, R. Harding, H. Heylen, G. Neyens, S. Pallada, N. Severijns, Ph. Velten, M. Walczak, F. Wienholtz, Z. Xu, X. Yang, D. Zakoucky, **New laser polarization line at the ISOLDE facility**, *J. Phys G: Nucl. and Part. Phys.* 44, 084005 (2017), cited 3 times; results of the online commissioning beamtime using the newly built ISOLDE laser polarization setup

A. Jancso, J. G. Correia, A. Gottberg, J. Schell, M. Stachura, D. Szunyogh, S. Pallada, D.C. Lupascu, **M. Kowalska***, L. Hemmingsen, **TDPAC and beta-NMR applications in chemistry and biochemistry**, *J. Phys G: Nuclear and Particle Physics* 44, 064003 (2017), (*corresponding author for beta-NMR part); cited 3 times; overview article on beta-NMR and TDPAC applications in life sciences

R.F. Garcia Ruiz, M. Bissell, K. Blaum, A. Ekström, N. Frömmgen, G. Hagen, M. Hammen, K. Hebel, J. D. Holt, G. R. Jansen, **M. Kowalska**, K. Kreim, W. Nazarewicz, R. Neugart, G. Neyens, W. Nörtershäuser, T. Papenbrock, J. Papuga, A. Schwenk, J. Simonis, K. A. Wendt, D. T. Yordanov, **Unexpectedly large charge radii of neutron-rich calcium isotopes**, *Nature Physics* 12, 594, (2016), cited 81 times; I participated in preparing the beta-detection part of the experiment and took part in the online run

A. Gottberg*, M. Stachura*, **M. Kowalska***, M.L. Bissell, V. Arcisauskaite, K. Blaum, A. Helmke, D.T. Yordanov, K. Kreim, K. Johnston, G. Neyens, R. Neugart, R. Garcia, D. Szunyogh, P.W. Thulstrup, F.H. Larsen, L. Hemmingsen, **Billion-Fold Enhancement in Sensitivity of Nuclear Magnetic Resonance Spectroscopy for Magnesium Ions in Solution**, *Chem. Phys. Chem* 15, 3929 (2014), (*contributed equally to the work), cited 8 times;; results from the proof-of-principle experiment leading to my ERC Grant

F. Wienholtz, D. Beck, K. Blaum, Ch. Borgmann, M. Breitenfeldt, R. B. Cakirli, S. George, F. Herfurth, J. D. Holt, **M. Kowalska**, S. Kreim, D. Lunney, V. Manea, J. Menéndez, D. Neidherr, M. Rosenbusch, L. Schweikhard, A. Schwenk, J. Simonis, J. Stanja, R. N. Wolf, K. Zuber, **Masses of exotic calcium isotopes pin down nuclear forces**, *Nature* 498, 346 (2013), cited 197 times; during my reintegration grant I was in charge of the commissioning of the electrostatic trap which allowed these measurements

M. Kowalska, S. Naimi, J. Agramunt, A. Algora, D. Beck, B. Blank, K. Blaum, Ch. Böhm, Ch. Borgmann, M. Breitenfeldt, L.M. Fraile, S. George, F. Herfurth, A. Herlert, S. Kreim, D. Lunney, E. Minaya-Ramirez, D. Neidherr, M. Rosenbusch, B. Rubio, L. Schweikhard, J. Stanja, and K. Zuber, **Trap-assisted decay spectroscopy with ISOLTRAP**, *Nucl. Instr. and Meth. A* 689, 102 (2012), cited 20 times; the experimental setup was built within my Marie curie Fellowship at ISOLTRAP

M. Kowalska, S. Naimi, J. Agramunt, A. Algora, G. Audi, D. Beck, B. Blank, K. Blaum, Ch. Böhm, M. Breitenfeldt, E. Estevez, L.M. Fraile, S. George, F. Herfurth, A. Herlert, A. Kellerbauer, D. Lunney, E. Minaya, D. Neidherr, B. Olaizola, K. Riisager, M. Rosenbusch, B. Rubio, S. Schwarz, L. Schweikhard, U. Warring, **Preparing a journey to the east of ^{208}Pb with ISOLTRAP: Isobaric purification at $A = 209$ and new masses for $^{211-213}\text{Fr}$ and ^{211}Ra** , *Eur. Phys. J. A* 42, 351 (2009), cited 11 times; the paper presents data collected during my Marie Curie Fellowship at ISOLTRAP

M. Kowalska, D.T. Yordanov, D. T., K. Blaum, P. Himpe, P. Lievens, S. Mallion, R. Neugart, G. Neyens, N. Vermeulen, **Nuclear ground-state spins and magnetic moments of ^{27}Mg , ^{29}Mg , and ^{31}Mg** , *Phys. Rev. C* 77, 034307 (2008), cited 46 times; this is the longer publication from my thesis

G. Neyens, **M. Kowalska**, D. Yordanov, K. Blaum, P. Himpe, P. Lievens, S. Mallion, R. Neugart, N. Vermeulen, Y. Utsuno and T. Otsuka, **Measurement of the Spin and Magnetic Moment of ^{31}Mg : Evidence for a Strongly Deformed Intruder Ground State**, *Phys. Rev. Lett.* 94, 022501 (2005), cited 129 times; this is the main publication from my PhD thesis