

## MAŽENA MACKOIT-SINKEVIČIENĖ

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## PROFESSIONAL EXPERIENCE

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- 2021 – now Postdoctoral researcher, **Institute of Theoretical Physics and Astronomy, VU**  
 Research on non-classical spin states in ultra-cold atomic gases. Member of Cold Atoms and Condensed Molecular Structures group under supervision of Prof. Gediminas Juzeliūnas.
- 2021 – now Junior researcher, **Department of Optoelectronics, FTMC**  
 Investigation of semiconductor nanostructures for Terahertz photonics. Member of Terahertz photonics laboratory.
- 2018 – now Assistant professor, **Institute of Photonics and nanotechnology, VU Faculty of Physics**  
 Courses taught: quantum mechanics and introduction to solid state physics for students at Faculty of Physics.
- 2016 – 2020 Junior Researcher, **Department of Fundamental Research, FTMC**  
 Non-classical spin states and single photon sources in solids. Member of Electronic Structure Theory laboratory. PhD dissertation work under supervision of Prof. Audrius Alkauskas.
- 2015 – 2016 Engineer, **Department of Optoelectronics, FTMC**  
 Work on defects for quantum information processing, NV centers in diamond.
- 2012 – 2015 Technician, **Institute of Applied Research**  
 Work on carrier dynamics and light emission efficiency in III-nitride structures.  
 Member of Semiconductor Photonics group, work under Prof. Gintautas Tamulaitis.

## EDUCATION

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- 2021 – now **Institute of Theoretical Physics and Astronomy, Vilnius University**  
 Postdoctoral fellowship, Project is funded by the European Social Fund. Grant is administered by the Lithuanian Research Council.
- 2016 – 2020 **Center for Physical Sciences and Technology and Vilnius University**  
 Doctor of Philosophy in Physics, thesis [epublications.vu.lt/Mackoit](http://publications.vu.lt/Mackoit)
- 2014 – 2016 **Vilnius University, Faculty of Physics**  
 Master of Physics. Graduated with distinction *Magna Cum Laude*.
- 2010 – 2014 **Vilnius University, Faculty of Physics**  
 Bachelor of Physics. Graduated with distinction *Cum Laude*.
- 2007 – 2010 **School for gifted Young Physicists Photon and Young Mathematicians LJMM**  
 Graduated with distinction.
- 2003 – 2010 **Juzefo Ignacijaus Kraševskio Middle school**  
 Graduated with distinction *Certificate with Honors*.

## RESEARCH INTERNSHIPS

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- 2021 **Institute of Physics of the Polish Academy of Sciences** in Warsaw, Poland, Quantum Technologies with Ultra-Cold Atoms, COST Internship no. CA16221, *Non-classical spin states in ultracold atomic Fermi gasses via spin-orbit coupling*, 09/19/2021 - 09/25/2021.
- 2021 **FOMO'2021 International Summer School** for Cold Atoms Theoretical Physicists and Experimentators *Quantum metrology: from solids to cold atoms*, Italy, 15/06/2021 - 22/07/2021.
- 2017 **University of Latvia**, workshop *Metrology at the Nanoscale with Diamonds*, Ryga, Latvia 12/12/2017 - 12/17/2017.

## AWARDS

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- 2021 **Best presentation Award at the Mathematics Conference**, 10th Lithuanian Mathematics Conference, Faculty of Mathematics, Vilnius University.
- 2021 **First place for the organization of the European Quantum Week in Lithuania** in the competition of science promotion projects organised by Lithuanian Academy of Science.
- 2021 **Award from the Government of Republic of Lithuania** for leading the Lithuanian Team of physicists at the International Physics Olympiad IPhO.
- 2021 **Finalist of the contest Polish Person of the Year in Lithuania** for the work in the field of science

and culture.

- 2020 **Lithuanian National Television Nomination** 2020 in the Discovery of the Year category.
- 2020 **Scholarship** of the Research Council of Lithuania.
- 2020 Chapter about my me and my work in the **book about women creating Lithuania** "Evening stories for Lithuanian girls: 100 stories about Lithuanian Women".
- 2019 **Scholarship** of the Research Council of Lithuania.
- 2018 **Talent of the Year Award**, Faculty of Physics, Vilnius University.
- 2018 **Graduate Student Award**, European Materials Research Society, Poland.
- 2018 **Scholarship** of the Research Council of Lithuania.
- 2018 **Infobalt Scholarship**, Young Scientist's Award in the competition.
- 2018 **Young Scientist's Award**, Lithuanian Academy of Sciences.
- 2017 **European Physical Society Young Minds Award**, Italy.
- 2017 **International Dr. Karl Mey Scholarship**, Germany.
- 2016 **Vilnius University Rector's acknowledgement**, Vilnius University.
- 2016 **Best Oral Presentation Award**, International Conference Open Readings.
- 2014 **Best Poster Presentation Award**, International Conference Open Readings.
- 2010 **3rd place in Lithuanian Mathematics and Physics Olympiads**, Vilnius city tour, Lithuania.

## LIST OF SCIENTIFIC PROJECTS

1. Project No. 09.3.3-LMT-K-712-23-0035 *Non-classical spin states in ultracold atomic gases*, Project is funded by the European Social Fund, the Grant is administered by the Lithuanian Research Council, 2021–2023.
2. DAINA project No. P-LL-21-29 *Spin-orbit coupling for the production of non-trivial quantum correlations in ultra-cold atomic gases*, Lithuanian Research Council, 2021.
3. European Union's Horizon 2020 Research and Innovation under Grant Agreement No. 820394, project Asteriqs [www.asteriqs.eu/](http://www.asteriqs.eu/)
4. Lithuanian Research Council (LRC) project *Metrology at the Nanoscale with Diamonds* (MyND) 2015–2018, Nr. MERA.NET-1/2015 [m-era.net](http://m-era.net).
5. TEMPUS project *Development of Training for Improving Education in Energy Efficiency*, Grant Nr. 530379-TEMPUS-1-2012-1-LVTEMPUS-JPCR.
6. Lithuanian Research Council (LRC) project *Enhancement of light emission efficiency in wide-band-gap nitride semiconductors*, MIP-054/2012, 2012-2015. Division of Semiconductor Optoelectronics, Luminescence spectroscopy group.
7. Student Research Practice (SMP 030/SMP12-090, project Nr. VP1-3.1-ŠMM-01-V-02-003, Lithuanian Research Council (LRC) project *Luminescence studies of different profiles InGaN QWs*.
8. Students' Scientific Practice (SMP 045/SMP13, Lithuanian Research Council (LRC) project *Spatially resolved luminescence in LGSO:Ce crystals*, The Research Council of Lithuania.
9. Students' Scientific Research (SMP 024), Lithuanian Research Council (LRC) project *Photoluminescence spatial distribution in InGaN layers, grown in different temperatures*.

## LIST OF SCIENTIFIC PUBLICATIONS

Out of those papers one publication was selected as **EDITORS' SUGGESTION** (in Phys. Rev. B **2018**) and one publication was featured on the **COVER** of Applied Physics Letters (2019).

- L. Skuja, K. Smits, A. Trukhin, F. Gahbauer, R. Ferber, M. Auzins, L. Busaite, L. Razinkovas, M. Mackoit-Sinkevičienė, A. Alkauskas, *Dynamics of singlet oxygen molecule trapped in silica glass, studied by luminescence polarization anisotropy and density functional theory*, **The Journal of Physical Chemistry C** **124**, 7244 (2020), [doi.org/10.1021/acs.jpcc.9b11581](https://doi.org/10.1021/acs.jpcc.9b11581).
- M. Mackoit-Sinkevičienė, M. Maciaszek, C. G. Van de Walle, A. Alkauskas, *Carbon dimer defect as a source of the 4.1 eV luminescence in hexagonal boron nitride*, **Applied Physics Letters** **115**, 212101 (2019), [doi.org/10.1063/1.5124153](https://doi.org/10.1063/1.5124153), [citation number 44](#).
- L. Weston. D. Wickramaratne, M. Mackoit, A. Alkauskas, C. G. Van de Walle, *Native point defects and impurities in hexagonal boron nitride*, **Physical Review B** **97**, 214104 (2018), [doi.org/10.1103/PhysRevB.97.214104](https://doi.org/10.1103/PhysRevB.97.214104), [citation number 162](#).
- L. Weston. D. Wickramaratne, M. Mackoit, A. Alkauskas, C. G. Van de Walle, Erratum: Phys. Rev. B **97**, 214104 (2020), [doi.org/10.1103/PhysRevB.102.099903](https://doi.org/10.1103/PhysRevB.102.099903).
- Z. Shotan, H. Jayakumar, C. R. Considine, M. Mackoit, H. Fedder, J. Wrachtrup, A. Alkauskas, M. W. Doherty, V. M. Menon, and C. A. Meriles, *Photo-induced modification of single-photon emitters in*

*hexagonal boron nitride*, **ACS Photonics** **3**, 2490-2496 (2016), [doi.org/10.1021/acsp Photonics.6b00736](https://doi.org/10.1021/acsp Photonics.6b00736), [citation number 130](#).

I wrote community report about Europe's Quantum Flagship initiative to magazine of European Physical Society and Overview of the activities of the Lithuanian Physical Society, academic book reviewer.

- [M. Mackoit-Sinkevičienė](#), *Education session at the First European Quantum Week*, **Europhysicsnews EPN** **52/2**, 14-15, (2021), [epn.eps.org/epn-52-2/16](https://epn.eps.org/epn-52-2/16).
- [M. Mackoit-Sinkevičienė](#), J. V. Vaitkus, G. Tautvaišienė, P. Balkevičius, G. Valušis, J. Šulskus, J. Tamulienė, A. Juodagalvis, J. Banyš, G. Laukaitis, Ž. Rutkūnienė, M. Sriubas, O. Rancova, V. Remeikis, R. Skorulskienė, *Overview of the activities of the Lithuanian Physical Society*, Abstract book of **44th Lithuanian National Physics Conference LNFK**, (2021), [lnfk.ftmc.lt](https://lnfk.ftmc.lt).
- [M. Mackoit-Sinkevičienė](#) writing **academic book review** for the book *Quantum computing* (in lithuanian *Kvantinė kompiuterija*), in preparation 2022/2023.

## MEMBERSHIPS AND ACTIVITIES

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- 2022 – now **Action Committee** member of the European Physical Society Young Minds. The aim of this work is to support professional skills of the next generations of physicist in Europe.
  - 2021 – now **Lithuania's representative** for the World Quantum Day.
  - 2021 – now **Coordination Team member** of World Quantum Day.
  - 2016 – 2022 **President** of European Physical Society Young Minds Vilnius Section.
  - 2018 – now **Board Member** of Lithuanian Physical Society.
  - 2021 – now **Member** of Lithuanian Society of Young Researchers.
  - 2021 – now **Team Leader of physicists** at the International Physics Olympiad IPhO.
  - 2020 – now **Thesis Defense Committee Member and Reviewer** of the bachelor's thesis at the VU Faculty of Physics.
  - 2019 – now **TV host of lithuanian Science Show *Physics with coffee*** broadcasted by the Lithuanian public broadcaster.

## PROFESSIONAL SERVICES

### Events organised

- 2022 Trained a number of young gifted Lithuanian students for physics competitions at **National Student Academy** winter session.
- 2022 Main organizer of the **World Quantum Day in Lithuania**. During WQD the Quantum Art Competition will be organized. Additionally, we will visit schools and during the national lecture on YouTube and on TV we will discuss the science.
- 2022 03 14 Scientific consultant and organizer of *Alice in the Scientific Wonderland*, **Vilnius University Drama Theater**. Performance dedicated to the birthday of physicist Albert Einstein. Funds raised for tickets were used to support the Ukraine.
- 2022 Local organizing committee of **14th European Conference on Atoms Molecules and Photons**, Vilnius, Lithuania.
- 2021 10 27-29 Scientific consultant for the performance of *Alice in the Scientific Wonderland*, **Vilnius University Drama Theater**.
- 2021 Organizer of the **Summer camp for children *Colonization of Mars***. This camp gave kids from Lithuania the opportunity to become junior scientists for a summer.
- 2017 – 2021 Organizing committee member of the **Lithuanian National Physics Conference**.
- 2020 Organizing committee member of **APROPOS 17** conference.
- 2015 – 2019 Organizing committee member of **Saulėtekis semiconductor physics seminars**, FTMC.
- 2018 Organizing committee member of **Humboldt Kolleg in Lithuania**.
- 2018 – 2019 Organizing committee member of **International Conference for students of Physics and Natural Sciences *Open Readings***.
- 2018 Organizing committee member of the **Lasers: Science and Technology** national conference.
- 2017 – 2018 Organizer of the **Lithuanian Pi Championship**.
- 2016 – 2017 Organizing committee member of **FizTech'17** conference.

### Invited talks

- 2022 **Open Readings conference Cafe Scientifique** as key note speaker for the [International Day of Women and Girls in Science](#).
- 2021 **Lithuanian Physics Teachers' Conference**, key note speaker *Machine learning and Artificial intelligence*.
- 2021 **Lithuanian Academy of Sciences**, September-December [lectures about my research, quantum computing and ultracold atoms for Lithuanians](#).
- 2021 **Novian Technologies Conference Technology and Resilience**, key note speaker [Artificial Intelligence and Machine Learning in Enterprises](#).
- 2021 **WoW university for Women**, key note speaker [What are quantum technologies?](#)
- 2020 **Quantum Flagship**, European Quantum Week Education session as keynote speaker, talk [2nd Quantum revolution](#).
- 2020 Invited speaker at Physics afternoon **Kaunas University of Technology**, talk [The Physics of movies](#).
- 2019 Invited speaker at **National Student Academy**, Physics division.
- 2019 **BAIP annual conference Technology and Resilience 2019**, as a keynote talk *Development of quantum technologies and quantum computers in Europe and the world*, BAIP, Litexpo.
- 2019 **VU ITPC Center** keynote talk/lecture *Quantum computer algorithms*, VU Botanical Garden.
- 2019 **Vilnius University**, Faculty of Physics freshmen camp, lecture *Studies at the Faculty of Physics and post-graduate opportunities like start-ups and companies*.

## CONFERENCES

- **M. Mackoit-Sinkevičienė** (presented), [Cold atoms and spin physics](#), 10th National Lithuanian Mathematics Conference, Faculty of Mathematics, Vilnius University, 28/12/2021.
- **M. Mackoit-Sinkevičienė** (presented), G. Žlabys, T. H. Yanes, M. Płodzień, E. Witkowska, G. Juzeliūnas, Simulation of one-axis squeezing with atomic fermions in optical lattices, The 44th Lithuanian National Conference on Physics, Vilnius, 6/10/2021.
- **M. Mackoit-Sinkevičienė** (presented), FOMO'2021 International Summer School conference *Quantum metrology: from solids to cold atoms*, 22/07/2021.
- **M. Mackoit-Sinkevičienė** (presented), M. Maciaszek, C. G. Van de Walle, A. Alkauskas, 43rd Lithuanian National Physics Conference, 2019-10-05, Kaunas, Lithuania.
- **M. Mackoit-Sinkevičienė** (presented), M. Maciaszek, C. G. Van de Walle, A. Alkauskas, Lithuania-Poland Workshop on Physics and Technology, 2019-09-27.
- **M. Mackoit-Sinkevičienė** (presented), M. Maciaszek, C. G. Van de Walle, A. Alkauskas, XLV Polish Physicists Conference and IPSEC XI Meeting, 2019-09-13, Krakow, Poland.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, L. Razinkovas, M. W. Doherty, C. G. Van de Walle, A. Alkauskas, International Conference APROPOS 16 *Advanced Properties and Processes in Optoelectronic Materials and Systems*, 2018-10-10.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, L. Razinkovas, M. W. Doherty, C. G. Van de Walle, A. Alkauskas, E-MRS Fall Meeting, 2018-09-16, Warsaw, Poland.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, C. G. Van de Walle, A. Alkauskas, Humboldt International Conference, 2018-07-29, Vilnius, Lithuania.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, M. W. Doherty, C. G. Van de Walle, A. Alkauskas, 7th European Physical Society Young Minds EPS-YM Meeting, Czech Technical University, 2018-05-03, Praha, Czech Republic.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, A. Alkauskas, C. G. Van de Walle, 61st Scientific Conference of Physics and Natural Sciences Open Readings, 2018-03-17, Vilnius, Lietuva.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, M. W. Doherty, C. G. Van de Walle, A. Alkauskas, Lithuanian Academy of Sciences 8th Conference of Young Scientists Physical and Technological Sciences Interdisciplinary Research, 2018-02-08, Vilnius, Lithuania.
- **M. Mackoit** (presented), A. Alkauskas, L. Weston, D. Wickramaratne, M. W. Doherty, C. G. Van de Walle, 42nd Lithuanian National Physics conference, 2017-10-04.
- **M. Mackoit** (presented), L. Weston, D. Wickramaratne, A. Alkauskas, C. G. Van de Walle, E-MRS Fall Meeting, 2017-09-21, Warsaw, Poland.

- **M. Mackoit** (presented), A. Alkauskas, Deutsche Physikalische Gesellschaft DPG conference, Spring Meeting of the Condensed Matter Section, 2017-03-20, Dresden, Germany.
- **M. Mackoit** (presented), A. Alkauskas, International Open Readings conference, 2017-03-14, Lithuania.
- **M. Mackoit** (presented), Z. Shotan, H. Yayakumar, C. R. Consideine, H. Fedder, J. Wrachtrup, A. Alkauskas, M. W. Doherty, V. Menon, C. A. Meriles, Lithuanian Academy of Sciences 7th Conference of Young Scientists Physical and Technological Sciences Interdisciplinary Research, Lithuanian Academy of Sciences, 2017-02-09, Vilnius, Lithuania.
- L. Skuja, A. Trukhin, K. Smits, F. Gahbauer, R. Ferber, M. Auzins, A. Alkauskas, L. Razinkovas, **M. Mackoit**, Anisotropy of singlet oxygen luminescence in silica, International Conference Functional Materials and Nanotechnologies, Ryga, Latvia, 2018/10/2.

## OUTREACH

From 2017 I constantly speak on Lithuanian national TV and radio about physics, science and education. **Over 40 episodes** about Physics in Science Show [Physics with coffee](#) broadcasted by Lithuanian public broadcaster, **over 60 interviews** for mass media (radio, TV, newspapers, broadcasts, etc.), I belong to Science for Ukraine team, etc.

As an example here are some interviews and TV episodes: LRT interview [Lithuanian physicist studying complex phenomena](#); LRT interview [M. Mackoit-Sinkevičienė about quantum computing and quantum physics](#); LRT „Švelnūs tardymai“ interview [Physicist M. Mackoit-Sinkevičienė and her love for science](#); 15min iterview [Physicist M. Mackoit-Sinkevičienė: love for science, Japanese language and poetry](#); Vilnius University M. Mackoit-Sinkevičienė scientific consultant in VU Theater "Alice in the Wonderland of Science"; Official webpage of World Quantum Day [M. Mackoit about World Quantum Day in Lithuania](#).

I'm **TV host** of LRT plus episodes *Physics with coffee* about: [Black hole](#), [Archer's paradox](#), [Einstein's general theory of relativity](#), [Alice in Wonderland of science](#), [Terahertz spectroscopy applied to the analysis of artists' materials](#), [What do hand warmers, COVID-19 and quantum computers have in common?](#), [Time crystals](#), [What do drones do in an anechoic chamber?](#), [Manufacture of smart clothing: polymers](#); [Magnus effect](#); [How to create a good superconductor?](#); [Chameleons: smart skin and photonic crystals](#); [Entropy and time arrow](#); [How do Lithuanians contribute to the improvement of space technologies?](#); [Wave-particle duality experiments](#).