

PERSONAL INFORMATION



Levente MÁTHÉ

 National Institute for Research and Development of Isotopic and Molecular Technologies (INCDTIM), Cluj-Napoca, Romania (Romania)
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 levente.mathe@itim-cj.ro

WORK EXPERIENCE

19/06/2018–Present

Scientific Researcher, Research Assistant

National Institute for Research and Development of Isotopic and Molecular Technologies (INCDTIM)
67-103 Donath, 400293 Cluj-Napoca (Romania)
<https://www.itim-cj.ro/>

Research area: Transport phenomena in graphene-based quantum dots, Charge transport in quantum dots connected to Majorana zero modes

Business or sector Government (research)

01/10/2016–30/06/2018

Teaching Activities

Babeş-Bolyai University - Faculty of Physics
01 Kogălniceanu, 400027 Cluj-Napoca (Romania)
<http://phys.ubbcluj.ro/>

Coordinating seminary activities: Solid State Physics (3rd year, 1st Semester: 2016/2017; 2017/2018), Electricity and Magnetism (1st year, 2nd Semester: 2016/2017; 2017/2018)

EDUCATION AND TRAINING

01/10/2016–15/09/2023

PhD Student

Babeş-Bolyai University - Faculty of Physics
01 Kogălniceanu, 400027 Cluj-Napoca (Romania)
http://phys.ubbcluj.ro

Research area: Physical Properties of Low-dimensional Systems

Scientific Supervisor: Prof. dr. Ioan Grosu

2014–2016

MSc: Solid State Physics

Babeş-Bolyai University - Faculty of Physics
01 Kogălniceanu, 400027 Cluj-Napoca (Romania)
http://phys.ubbcluj.ro

Dissertation Title: Transport Through a Quantum Dot with Electron-Phonon Interaction

Scientific Supervisor: Prof. dr. Ioan Grosu

2014–2016

Pedagogical Module Level 2

Babeş-Bolyai University, Cluj-Napoca (Romania)

2010–2014

BSc: Engineering Physics

Babeş-Bolyai University - Faculty of Physics
01 Kogălniceanu, 400027 Cluj-Napoca (Romania)

<http://phys.ubbcluj.ro>

Thesis Title: Measuring the Speed of Light with Laser Pulses

Scientific Supervisors: Prof. dr. Néda Zoltán, dr. ing. Tunyagi Arthur

2010–2013 **Pedagogical Module Level 1**

Babeş-Bolyai University, Cluj-Napoca (Romania)

2006–2010 **High school: Automation Technician**

Technological High School - Grup Școlar Electromureș
5 Livezeni, 540485 Târgu Mureș (Romania)

<http://www.electromures.net>

Thesis Title: Digital Timer

Scientific Coordinator: Prof. Pethő Ladislau

PERSONAL SKILLS

Mother tongue(s) Hungarian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
Romanian	C1	C1	C1	B2	B2
English	B2	C1	B2	B2	B2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills Adequate written and oral communication skills that I practiced through teaching and giving presentations.

Job-related skills Teaching experience

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem-solving
Independent user	Independent user	Proficient user	Proficient user	Independent user

Digital skills - Self-assessment grid

- Advanced knowledge of programs: Wolfram Mathematica, LaTeX, Autodesk Inventor, Origin and Microsoft Office;

- Basic knowledge of programs: Avogadro, Gauss View;

- Advanced knowledge of graphical applications: Corel Draw;

- Basic knowledge of programming languages: Python, C;

Other skills - I am passionate about graphic design and wood carving.

ADDITIONAL INFORMATION

Journal Referee for: Applied Physics A

List of publications connected with the thesis

1. **L. Máthé**, Z. Kovács-Krausz, I. Botiz, I. Grosu, K. El Anouz, A. El Allati, and L. P. Zârbo, Phonon-assisted tunneling through quantum dot systems connected to Majorana bound states, *Nanomaterials* **13**, 1616 (2023)
2. **L. Máthé**, D. Sticlet and L. P. Zârbo, Quantum transport through a quantum dot side-coupled to a Majorana bound state pair in the presence of electron-phonon interaction, *Phys. Rev. B* **105**, 155409 (2022)
3. **L. Máthé**, C. P. Onyenegecha, A.-A. Farcaş, L.-M. Pioraş-Țimbolmaş, M. Solaimani and H. Hassanabadi, Linear and nonlinear optical properties in spherical quantum dots: Inversely quadratic Hellmann potential, *Phys. Lett. A* **397**, 127262 (2021)
4. **L. Máthé** and I. Grosu, Nonequilibrium Kondo effect in a graphene-coupled quantum dot in the presence of a magnetic field, *Beilstein J. Nanotechnol.* **11**, 225 (2020)

Other publications

1. **L. Máthé** and I. Grosu, Transport Through a Quantum Dot with Electron-Phonon Interaction, *Mater. Today: Proc.* **5**, 15878 (2018)

Scientometry

Citations: 98 (without self-citations)
Conference/Workshops/Schools attending: oral presentations: 9; poster presentations: 16.

Prizes

1. **L. Máthé**, I. Grosu, L. P. Zârbo, *Majorana fingerprints in an asymmetrically connected quantum dot nanodevice under electron-phonon effects*, 15th International Conference on Physics of Advanced Materials (ICPAM 15), 19-26 November 2023, Sharm El Sheikh, Egypt – **Sponsor's Prize** offered by **NANOTEAM**
2. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Andreev conductance through a quantum dot-Majorana ring structure*, 4th Autumn School on Physics of Advanced Materials (PAMS 4), 24-30 September 2021, Sant Feliu de Guixols, Spain – **Sponsor's Prize** offered by **American Elements**
3. **L. Máthé**, I. Grosu, *Nonequilibrium Kondo effect in a quantum dot coupled to graphene electrodes in presence of a magnetic field*, 12th International Conference on Physics of Advanced Materials (ICPAM 12), 22-28 September 2018, Heraklion, Greece – **Nicolae Sulitanu Prize** offered by **Alina Sulitanu**

Conference/Workshop/School

Attending

Oral Presentations

1. **L. Máthé**, I. Grosu, L. P. Zârbo, *Majorana fingerprints in an asymmetrically connected quantum dot nanodevice under electron-phonon effects*, 15th International Conference on Physics of Advanced Materials (ICPAM 15), 19-26 November 2023, Sharm El Sheikh, Egypt
2. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Phonon signatures in Majorana mode detection for quantum computing*, International Conference on Advanced Scientific Computing (ICASC 2023), 18-20 October 2023, Cluj-Napoca, Romania
3. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Phonon-assisted transport in quantum dot-Majorana wire systems*,

exosup2022: School on Exotic Superconductivity, 13-25 June 2022, Cargèse, Corse, France (student talk)

4. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Detecting Majorana bound states in hybrid quantum dot-topological superconducting nanowire devices*, 2nd Global Webinar on Materials Science and Engineering, 27 November 2021, in Webinar.

5. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Probing Majorana bound states in a quantum dot-topological superconducting nanowire ring system*, 38th Global Nanotechnology Congress, 01-02 November 2021, in Webinar

6. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Quantum transport through a quantum dot side-coupled to a Majorana bound state pair in presence of electron-phonon interaction*, 13th International Conference on Physics of Advanced Materials (ICPAM-13), 24-30 September 2021, Sant Feliu de Guixols, Spain

7. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Introduction to Majorana bound states: transport through a quantum dot coupled to Majorana bound states in presence of electron-phonon interaction*, High Impedance Quantum Circuits, 6-10 August 2019, Villa Nante, Piedmont, Italy

8. **L. Máthé**, I. Grosu, *Thermoelectric transport through a quantum dot connected to vinebreak graphene leads: Transition from the Coulomb blockade to the Kondo regime*, 19th International Balkan Workshop on Applied Physics and Materials Science (IBWAP 2019), 16-19 July 2019, Constanța, Romania

9. **L. Máthé**, I. Grosu, *Splitting of the Kondo peak in a quantum dot attached to graphene contacts*, 24th International Conference on Chemistry, 24-27 October 2018, Sovata, Romania

Poster Presentations

1. **L. Máthé**, I. Grosu, I. Botiz, L. P. Zârbo, *Phonon signatures in the tunneling current through quantum dot-Majorana nanowire junctions*, From Solid State to Biophysics XI, 8-15 June 2024, Dubrovnik, Croatia.

2. **L. Máthé**, I. Grosu, L. P. Zârbo, *Phonon-assisted tunneling current through a quantum dot coupled to a Majorana nanowire*, 14th International Conference on Processes in Isotopes and Molecules (PIM 2023), 19-22 September 2023, Cluj-Napoca, România.

3. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Majorana induced phonon-assisted transport in asymmetrically coupled quantum dot nanodevices*, International Conference on Quantum Communication, Measurement and Computing (QCMC 2022), 11-15 July 2022, Lisbon, Portugal.

4. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Phonon-assisted transport in quantum dot-Majorana wire systems*, exosup2022: School on Exotic Superconductivity, 13-25 June 2022, Cargèse, Corse, France.

5. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Majorana bound state signatures in current through quantum dots in the presence of electron-phonon coupling*, 38th Global Nanotechnology Congress, 01-02 November 2021, in Webinar

6. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Quantum transport through a quantum dot coupled to a Majorana ring*, 13th International Conference on Processes in Isotopes and Molecules (PIM 2021), 22-24 September 2021, Cluj-Napoca, Romania

7. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Phonon-assisted transport in a quantum dot coupled to a Majorana*

bound state, VCQ Summer School 2021-Quantum Sensing & Imaging, 06-10 September 2021, Vienna, Austria

8. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Andreev conductance through a quantum dot-Majorana ring structure*, 4th Autumn School on Physics of Advanced Materials (PAMS 4), 24-30 September 2021, Sant Feliu de Guixols, Spain

9. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Quantum transport through a quantum dot coupled to a Majorana ring in the presence of phonon modes*, Workshop on Quantum Information Theory and Thermodynamics at the Nanoscale, 2-6 March 2020, Al-Hoceima, Morocco

10. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Transport through a quantum dot coupled to Majorana bound states in presence of electron-phonon interaction*, Conference on Signatures of Topology in Condensed Matter, 21-25 October 2019, Trieste, Italy

11. **L. Máthé**, D. Sticlet, L. P. Zârbo, *Effect of the electron-phonon interaction on the transport properties of a quantum dot connected to Majorana bound states*, 12th International Conference on Processes in Isotopes and Molecules (PIM 2019), 25-27 September 2019, Cluj-Napoca, Romania

12. **L. Máthé**, I. Grosu, *Graphene-based single electron transistor: transition from the Coulomb blockade to Kondo effect*, Interfaces in Organic and Hybrid Thin-Film Optoelectronics (INFORM-19), 5-7 March 2019, Valencia, Spain

13. **L. Máthé**, I. Grosu, *Kondo Resonance splitting in a graphene-based quantum dot*, 10th International Conference on Nanomaterials –R&A (NANOCON 2018), 17-19 October 2018, Brno, Czechia

14. **L. Máthé**, I. Grosu, *Nonequilibrium Kondo effect in a quantum dot coupled to graphene electrodes in presence of a magnetic field*, 12th International Conference on Physics of Advanced Materials (ICPAM-12), 22-28 September 2018, Heraklion, Greece

15. **L. Máthé**, I. Grosu, *Transport through a strongly interacting quantum dot coupled to graphene electrodes*, 3rd International Conference on Nanomaterials: Fundamentals and Applications (NFA 2017), 9-11 October 2017, Štrbské Pleso, Slovakia

16. **L. Máthé**, I. Grosu, *Transport through a quantum dot with electron-phonon interaction*, 2nd Autumn School on Physics of Advanced Materials (PAMS-2), 8-14 September 2016, Cluj-Napoca, Romania

School Attending

1. **L. Máthé**, School on Quantum Information Theory and Thermodynamics at the Nanoscale, 24-28 February 2020, Al-Hoceima, Morocco