1 Personal details and date of CV

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- Date of CV: March 18, 2024

2 Degrees

- Sep 28, 2021 Title of Docent, theoretical physics, University of Helsinki, Finland
- Jun 15, 2016 Doctor of Philosophy, theoretical physics, University of Jyväskylä, Finland
  Thesis: *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*
  Supervisor: Prof. Robert van Leeuwen
- Mar 2, 2011 Master of Science, theoretical physics, University of Jyväskylä, Finland
  Thesis: *Many-particle approach to the image-charge effect*
  Supervisor: Prof. Robert van Leeuwen
- Apr 28, 2010 Bachelor of Science, physics, University of Jyväskylä, Finland
  Thesis (in Finnish): *Diracin yhtälön ratkaisut pallosymmetrisessä potentiaalikuopassa*
  Supervisor: Prof. Kari J. Eskola

3 Other education and expertise

- 2009–2010 Completion of 60 ECTS credits of pedagogical studies at the University of Jyväskylä amounting to the formal qualification of teachers.

4 Language skills

- Finnish: native speaker
- English: highly proficient
- Swedish: working knowledge
- German: working knowledge

5 Current employment

- Sep 2022 –, Senior Lecturer in Theoretical Nanophysics, Department of Physics, University of Jyväskylä, Finland.

6 Previous work experience

- Jan 2021 – Aug 2022, Academy of Finland postdoctoral researcher, Department of Physics, University of Helsinki, Finland. Project No. 345007 *Ultrafast many-body correlations in quantum transport and spectroscopy*.
- Sep 2019 – Dec 2020, Academy of Finland postdoctoral researcher, Department of Physics and Astronomy, University of Turku, Finland. Project No. 321540 *Ultrafast many-body correlations in quantum transport and spectroscopy*.
- Oct 2016 – Aug 2019, Postdoctoral researcher, Max Planck Institute for the Structure and Dynamics of Matter, Germany. Conducting research in the *Theory of pump-probe spectroscopy* group of Dr. Michael A. Sentef at the Theory Department of Prof. Angel Rubio.
- Apr 2011 – Jun 2016, Researcher, doctorand, Department of Physics, University of Jyväskylä, Finland. Conducting research in the *Quantum Many-Body Theory* group of Prof. Robert van Leeuwen.
- Jan 2013 – May 2013, Physics teacher (part time), Valmennuskeskus, Finland. Teaching physics in two preparatory courses for studies in medicine.
- May 2010 – Mar 2011, Trainee, Department of Physics, University of Jyväskylä, Finland. Research training in the Academy of Finland project 127739 *Time-dependence and electron correlations in quantum transport* led by Prof. Robert van Leeuwen.
- May 2010, Substitute physics teacher (part time), University of Jyväskylä Teacher Training School (Normaalikoulu), Finland. Teaching upper secondary school physics classes about electromagnetism.
- Sep 2009 – May 2010, Teacher trainee (part time), Department of Teacher Education, University of Jyväskylä, Finland. Teaching secondary school classes about physics and mathematics as a part of the pedagogics studies
- Apr 2010, Tutor (part time), Department of Teacher Education, University of Jyväskylä, Finland. Co-organizing a training camp for the International Physics Olympiad.
- Jun 2009 – Jul 2009, Trainee, summer student, Department of Physics, University of Jyväskylä, Finland. Research training in the *Quantum Many-Body Theory* group of Prof. Robert van Leeuwen and in the *Quantum control and dynamics* group of Prof. Esa Räsänen.

7 Research funding and grants (total acquired funding 373 k€)

- Sep 2019 – Aug 2022, Research grant from the Academy of Finland for individual postdoctoral research, 254 000 €, principal investigator
- May 2019, Young researcher's scholarship for postdoctoral research from the Emil Aaltonen foundation, 31 500 €, principal investigator (declined in favour of the Academy of Finland grant)
- Sep 2011 – Dec 2015, Funding for doctoral studies from the Vilho, Yrjö and Kalle Väisälä foundation and from the Ellen and Artturi Nyyssönen foundation, totalling 87 600 €, principal investigator

8 Research output

- Contributing to the research field of *non-equilibrium many-body quantum systems*: Development of Green's function methods for the coupled dynamics of electrons and bosons in nanosystems, transient spectroscopy and transport in molecular junctions.

- Publication summary: 22 original, peer-reviewed research articles in internationally recognized journals, such as Physical Review, Nanoscale, and New Journal of Physics, with 485 citations, h-index 14 (Google Scholar).

  Full list: `http://users.jyu.fi/~rimasatu/publications.html`

  Five most cited publications:

  - R. Tuovinen, E. Perfetto, G. Stefanucci, and R. van Leeuwen, *Time-dependent Landauer–Büttiker formula: Application to transient dynamics in graphene nanoribbons*, Phys. Rev. B **89**, 085131 (2014), arXiv:1312.6006
  - F. Covito, F. G. Eich, R. Tuovinen, M. A. Sentef, and A. Rubio, *Transient charge and energy flow in the wide-band limit*, J. Chem. Theory Comput. **14**, 2495 (2018), arXiv:1801.08440
  - P. Myöhänen, R. Tuovinen, T. Korhonen, G. Stefanucci, and R. van Leeuwen, *Image charge dynamics in time-dependent quantum transport*, Phys. Rev. B **85**, 075105 (2012), arXiv:1111.6104
  - R. Tuovinen, R. van Leeuwen, E. Perfetto, and G. Stefanucci, *Time-dependent Landauer–Büttiker formula for transient dynamics*, J. Phys. Conf. Ser. **427**, 012014 (2013), arXiv:1303.6201
  - R. Tuovinen, D. Golež, M. Eckstein, and M. A. Sentef, *Comparing the generalized Kadanoff-Baym ansatz with the full Kadanoff-Baym equations for an excitonic insulator out of equilibrium*, Phys. Rev. B **102**, 115157 (2020), arXiv:2007.07801

- Developer of the `CHEERS` code, a general-purpose nonequilibrium Green's function method for first principles studies of ultrafast processes in molecular and solid state systems: Phys. Status Solidi B, 2300504 (2023) (2023).

- Developer of the TDLB calculation method for time-resolved quantum transport including two open-source code repositories: `QPORT`, `https://bitbucket.org/rtuovine/qport` (2016); `WBPhonon`, `https://bitbucket.org/rtuovine/wbphonon` (2016).

9 Research supervision and leadership experience

- 2023 Supervisor of three BSc theses, University of Jyväskylä, Finland

- 2023 Co-supervisor of two summer interns in condensed matter theory (two months), University of Jyväskylä, Finland

- 2020–2022 Co-supervisor of a MSc thesis, University of Turku, Finland

- 2017–2022 Hands-on work together with doctoral students and earlier-stage post-doctoral researchers (programming, data analysis, scientific writing)
- 2020–2022 Co-authoring and coordinating a large-scale review article:

  M. Ridley, N. W. Talarico, D. Karlsson, N. Lo Gullo, and R. Tuovinen, *A many-body approach to transport in quantum systems: From the transient regime to the stationary state*, J. Phys. A: Math. Theor. **55**, 273001 (2022), arXiv:2201.02646

10 Teaching merits

- *Qualification*

  2010 University of Jyväskylä: Completion of 60 ECTS credits of pedagogical studies amounting to the formal qualification of teachers

  2021 University of Helsinki: Assessment of teaching skills for the Title of Docent – Teaching demonstration *very good* (4/5); overall teaching skills *very good* (4/5)

  2022 University of Jyväskylä: Assessment of teaching skills for the Senior Lecturer position – Test lecture *excellent* (5/5)

- *Experience*
  - Lecturer (including course planning, preparing learning material, grading, and coordinating a team of teaching assistants)

    2024 University of Jyväskylä: MSc/PhD level course on many-particle quantum mechanics

    2023–2024 University of Jyväskylä: Two MSc level courses on advanced quantum mechanics

    2021 University of Helsinki: Two new MSc/PhD level courses of my design about advanced statistical physics and many-body quantum theory

    2014–2015 University of Jyväskylä: Five BSc level courses *Mechanics, introduction* (two times), *Mechanics, continuation* (three times)
  - Teaching assistant

    2024 University of Jyväskylä: Teacher tutor (*omaopettaja*) on courses for first-year students "Physicist's Worldline" and "Personal Study Plan for BSc"

    2020 University of Turku: BSc level course *Introduction to electromagnetism*

    2010–2013 University of Jyväskylä: 11 BSc and MSc level courses on topics such as *mechanics, thermodynamics, electromagnetism, statistical physics*
  - Thesis supervisor

    2023 University of Jyväskylä: Supervisor of three BSc theses

    2020–2022 University of Turku: Co-supervisor of a MSc thesis

- *Development*
  - Development of undergraduate degree syllabi for physics (BSc level) and materials physics (MSc level), University of Jyväskylä (2022–)
  - Participation in a university-wide, interdisciplinary teaching development project by the Faculty of Education at the University of Jyväskylä (2011–2013)
  - Development of various interactive, peer-instructive teaching methods at the University of Jyväskylä (2010–2016)

11 Awards and honours

- Best oral presentation award at Physics Days 2022, Espoo, Finland (virtual)
- Best oral presentation award at Nanoscience Days 2019, Jyväskylä, Finland

12 Other key academic merits

- Four invited talks at international conferences, seven invited seminar talks, 12 contributed talks and 12 contributed posters at international conferences
- Journal refereeing for Physical Review B, Physical Review Letters, Physical Review Research, Physical Review Applied, Physical Review Materials, Physical Review A, Nanoscale, Nano Letters, Communications Physics, SciPost Physics, Physica Status Solidi B, Journal of Applied Physics, Transactions on Nanotechnology, and Journal of Computational Electronics
- Member of the recruitment panel of a university lecturer position in physics teacher education, University of Jyväskylä (2023)
- Member of the admissions panel for international master's degree programme, University of Jyväskylä (2024)
- Funding application reviewer for the German Research Foundation DFG (2024)
- Funding application reviewer for the Israel Science Foundation (2022)
- Co-organizer of an international conference Progress in Nonequilibrium Green's functions V (Jyväskylä, Finland, 2012)
- Co-editor of a conference proceedings Progress in Nonequilibrium Green's Functions V, IOP Publishing, https://iopscience.iop.org/1742-6596/427/1 (2012–2013)

13 Scientific and societal impact

- Member of the program committee for Euro-Par 2024 "Workshop in High-Performance Computing in Physics" (PHYSHPC), Madrid, Spain (2024)
- Co-hosting a stand at a science festival for the general public ("Sommer des Wissens") about Michelson interferometer and a laser game, Hamburg, Germany (2019)
- Member of the scientific advisory board for ETSF Young Researchers' Meeting, Max Planck Institute for the Structure and Dynamics of Matter, Germany (2017–2018)
- Co-hosting a stand at the DESY Open Day for the general public ("Nacht des Wissens") on a computer game about protein folding, Hamburg, Germany (2017)

14 Invited talks

11. *Time-resolved quantum transport with correlated nonequilibrium Green's functions*, August 10th 2023, Progress in Nonequilibrium Green's Functions 8, Örebro, Sweden
10. *Time-linear scaling nonequilibrium Green's function theory for quantum transport*, November 10th 2022, seminar, University of Michigan, Ann Arbor (virtual)
9. *Time-linear non-equilibrium Green's function approach to correlated quantum transport*, August 3rd 2022, Frontiers of Quantum and Mesoscopic Thermodynamics, Prague, Czech Republic
8. *A many-body approach to transport in quantum systems*, May 5th 2022, seminar, Tampere University, Finland
7. *Adiabatic Preparation of a Correlated Symmetry-Broken Initial State with the Generalized Kadanoff-Baym Ansatz*, March 11th 2019, Solving the Two-time Kadanoff-Baym Equations. Status and Open Problems, Christian-Albrechts-Universität, Kiel, Germany
6. *Ultrafast many-body correlations in an excitonic insulator out of equilibrium*, December 11th 2018, seminar, University of Turku, Finland
5. *Transient dynamics in an excitonic insulator: Fast computation of nonequilibrium Green's functions*, June 26th 2018, seminar, Christian-Albrechts-Universität, Kiel, Germany
4. *Nonequilibrium Green's functions for dummies by a dummy*, June 6th 2018, ETSF Young Researchers' Meeting, Hamburg, Germany
3. *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, May 10th 2017, seminar, Trinity College, Dublin, Ireland
2. *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, June 29th 2016, seminar, Max Planck Institute for the Structure and Dynamics of Matter, Hamburg, Germany

1. *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, June 23rd 2016, seminar, Technical University of Denmark, Lyngby, Denmark

15 Contributed talks and posters

22. *Time-linear quantum transport simulations with correlated nonequilibrium Green's functions*, March 29th 2023, talk, DPG Spring Meeting, Dresden, Germany

21. *Electron correlation effects in superconducting nanowires in and out of equilibrium*, October 4th 2022, poster, Nanoscience Days 2022, Jyväskylä, Finland

20. *Electron correlation effects in superconducting nanowires in and out of equilibrium*, March 3rd 2022, talk, Physics Days, Espoo (virtual)

19. *Electronic transport in molecular junctions: The GKBA with initial contact and correlations*, October 5th 2021, poster, Nanoscience Days 2021 (virtual)

18. *Electronic transport in molecular junctions: The GKBA with initial contact and correlations* September 28th 2021, poster, DPG SKM 2021 (virtual)

17. *Electron correlation effects in superconducting nanowires in and out of equilibrium*, June 8th 2021, poster, Toposuper2021 Emergent topological superconductivity (virtual)

16. *Comparing the generalized Kadanoff-Baym ansatz with the full Kadanoff-Baym equations for an excitonic insulator out of equilibrium*, June 8th 2021, talk and poster, New generation of strongly correlated electrons (virtual)

15. *Ultrafast many-body correlations in an excitonic insulator out of equilibrium*, March 25th 2021, poster, Physics Days, Jyväskylä (virtual)

14. *Time-resolved impurity-invisibility in graphene nanoribbons*, October 9th 2019, talk, Nanoscience Days 2019, Jyväskylä, Finland

13. *Time-resolved Majorana-fermion dynamics in topological superconducting wires*, April 1st 2019, talk, DPG Spring Meeting, Regensburg, Germany

12. *Adiabatic Preparation of a Correlated Symmetry-Broken Initial State with the Generalized Kadanoff-Baym Ansatz*, August 29th 2018, poster, Progress in Nonequilibrium Green's Functions VII, Frascati, Italy

11. *Transient dynamics in an excitonic insulator*, July 17th 2018, poster, Ultrafast Phenomena XXI, Hamburg, Germany

10. *Transient dynamics in an excitonic insulator: Fast computation of nonequilibrium Green's functions* March 15th 2018, talk, DPG Spring Meeting, Berlin, Germany

9. *Keldysh Green's function technique: Accessing the transient dynamics in laser-driven superconductors*, August 5th 2017, poster, Mesoscopic Transport and Quantum Coherence, Espoo, Finland

8. *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach* March 22nd 2017, talk, DPG Spring Meeting, Dresden, Germany

7. *Extending the time-dependent Landauer-Büttiker formalism to superconducting junctions and arbitrary temperatures*, August 18th 2015, talk and poster, Progress in Nonequilibrium Green's Functions VI, Lund, Sweden

6. *Curvature in graphene nanoribbons generates temporally and spatially focused electric currents*, March 19th 2015, talk, Physics Days, Helsinki, Finland

5. *Quantum dynamics in graphene nanoribbons*, May 14th 2014, talk, ETSF Young Researchers' Meeting, Rome, Italy

4. *Quantum dynamics in graphene nanoribbons*, March 13th 2014, talk, Physics Days, Tampere, Finland

3. *Quantum transport with time-dependent Landauer-Büttiker formalism for transient dynamics*, March 15th 2013, poster, Physics Days, Espoo, Finland

2. *Transient dynamics without time propagation*, August 30th 2012, talk, Progress in Nonequilibrium Green's Functions V, Jyväskylä, Finland

1. *Quantum transport through topological flat-band lattices*, March 14th 2012, poster, Physics Days, Joensuu, Finland