Curriculum vitae – Riku Tuovinen

PERSONAL DETAILS

Name: Riku-Matti Salomo Tuovinen
Date of birth: 14.11.1986
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DEGREES

Title of Docent, *theoretical physics*, University of Helsinki **28.09.2021**

Doctor of Philosophy, *theoretical physics*, University of Jyväskylä **15.06.2016**
Thesis: *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, supervisor: Prof. Robert van Leeuwen

Master of Science, *theoretical physics*, University of Jyväskylä **02.03.2011**
Thesis: *Many-particle approach to the image-charge effect*, supervisor: Prof. Robert van Leeuwen

Bachelor of Science, *physics*, University of Jyväskylä **28.04.2010**
Thesis (in Finnish): *Diracin yhtälön ratkaisut pallosymmetrisessä potentiaalikuopassa*, supervisor: Prof. Kari J. Eskola

WORK EXPERIENCE

University of Helsinki, Department of Physics
Postdoctoral Researcher (Academy of Finland) **01.01.2021 – 31.08.2022**
Principal investigator of the project *Ultrafast many-body correlations in quantum transport and spectroscopy* (Project No. 345007)

University of Turku, Department of Physics and Astronomy
Postdoctoral Researcher (Academy of Finland) **01.09.2019 – 31.12.2020**
Principal investigator of the project *Ultrafast many-body correlations in quantum transport and spectroscopy* (Project No. 321540)

Max Planck Institute for the Structure and Dynamics of Matter
Postdoctoral Researcher **01.10.2016 – 31.08.2019**
Conducting research in the *Theory of pump-probe spectroscopy* group of Dr. M. Sentef

University of Jyväskylä, Department of Physics
Researcher, doctoral student **01.04.2011 – 30.6.2016**
Conducting research in the *Quantum Many-Body Theory* group of Prof. R. van Leeuwen

Valmennuskeskus
Physics teacher **30.01. – 16.05.2013**
Teaching physics in two preparatory courses for medical school

University of Jyväskylä, Department of Physics
Trainee **01.05.2010 – 31.03.2011**
Research training in a project of the Academy of Finland "Time-dependence and electron correlations in quantum transport" lead by Prof. R. van Leeuwen

University of Jyväskylä Teacher Training School (Normaalikoulu)
Substitute for a physics teacher **05.05. – 07.05.2010**
Teaching upper secondary school physics classes about electromagnetism

University of Jyväskylä, Department of Teacher Education
Teacher trainee **01.09.2009 – 31.05.2010**
Teaching secondary school classes about physics and mathematics as a part of the pedagogics studies

University of Jyväskylä, Department of Teacher Education
Tutor **10.04. – 11.04.2010**
Tutoring laboratory exercises in a training camp for the international physics olympiad

University of Jyväskylä, Department of Physics
Trainee **01.06. – 31.07.2009**
Research training in the group *Quantum Many-Body Theory* of Prof. R. van Leeuwen and in the group *Quantum control and dynamics* of Prof. E. Räsänen

PUBLICATIONS

Summary: 19 original research articles, 340 citations, h-index 12 (Google Scholar)

Full list of publications: https://www.mv.helsinki.fi/home/rikutuov/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

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

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

R. Tuovinen, N. Säkkinen, D. Karlsson, G. Stefanucci, and R. van Leeuwen, *Phononic heat transport in the transient regime: An analytic solution*, Phys. Rev. B **93**, 214301 (2016), arXiv:1604.02298

ACQUIRED RESEARCH FUNDING (TOTAL 342 K€)

(2019) 254 k€ from the Academy of Finland for independent postdoctoral research
(2015) 23 k€ from the Vilho, Yrjö and Kalle Väisälä foundation for doctoral studies
(2014) 23 k€ from the Vilho, Yrjö and Kalle Väisälä foundation for doctoral studies
(2013) 23 k€ from the Vilho, Yrjö and Kalle Väisälä foundation for doctoral studies
(2012) 19 k€ from the Ellen and Artturi Nyyssönen Foundation for doctoral studies

INVITED TALKS

- *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
- *Ultrafast many-body correlations in an excitonic insulator out of equilibrium*, December 11th 2018, seminar, University of Turku
- *Transient dynamics in an excitonic insulator: Fast computation of nonequilibrium Green's functions*, June 26th 2018, seminar, Christian-Albrechts-Universität, Kiel
- *Nonequilibrium Green's functions for dummies by a dummy*, June 6th 2018, ETSF Young Researchers' Meeting, Hamburg
- *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, May 10th 2017, seminar, Trinity College, Dublin
- *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
- *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach*, June 6th 2016, seminar, Technical University of Denmark, Lyngby

CONTRIBUTED TALKS AND POSTERS

- *Electronic transport in molecular junctions: The GKBA with initial contact and correlations*, October 5th 2021, poster, Nanoscience Days 2021 (virtual)
- *Electronic transport in molecular junctions: The GKBA with initial contact and correlations* September 28th 2021, poster, DPG SKM 2021 (virtual)
- *Electron correlation effects in superconducting nanowires in and out of equilibrium*, June 8th 2021, poster, Toposuper2021 Emergent topological superconductivity (virtual)
- *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)
- *Ultrafast many-body correlations in an excitonic insulator out of equilibrium*, March 25th 2021, poster, Physics Days, Jyväskylä (virtual)
- *Time-resolved impurity-invisibility in graphene nanoribbons*, October 9th 2019, talk, Nanoscience Days 2019, Jyväskylä
- *Time-resolved Majorana-fermion dynamics in topological superconducting wires*, April 1st 2019, talk, DPG Spring Meeting, Regensburg
- *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

- *Transient dynamics in an excitonic insulator*, July 17th 2018, poster, Ultrafast Phenomena XXI, Hamburg
- *Transient dynamics in an excitonic insulator: Fast computation of nonequilibrium Green's functions* March 15th 2018, talk, DPG Spring Meeting, Berlin
- *Keldysh Green's function technique: Accessing transient dynamics*, August 5th 2017, poster, Mesoscopic Transport and Quantum Coherence, Espoo
- *Time-dependent quantum transport in nanosystems: A nonequilibrium Green's function approach* March 22nd 2017, talk, DPG Spring Meeting, Dresden
- *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
- *Curvature in graphene nanoribbons generates temporally and spatially focused electric currents*, March 19th 2015, talk, Physics Days, Helsinki
- *Quantum dynamics in graphene nanoribbons*, May 14th 2014, talk, ETSF Young Researchers' Meeting, Rome
- *Quantum dynamics in graphene nanoribbons*, March 13th 2014, talk, Physics Days, Tampere
- *Quantum transport with time-dependent Landauer-Büttiker formalism for transient dynamics*, March 15th 2013, poster, Physics Days, Espoo
- *Transient dynamics without time propagation*, August 30th 2012, talk, Progress in Nonequilibrium Green's Functions V, Jyväskylä
- *Quantum transport through topological flat-band lattices*, March 14th 2012, poster, Physics Days, Joensuu

ACADEMIC 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 and merits for the Title of Docent – Teaching demonstration *very good*; overall teaching skills *very good*

Experience:

- Lecturer (incl. course planning, preparing learning material, and grading)

  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

  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

  2020– University of Turku: Co-supervising a MSc thesis

Development:

2011–2013 Participation in a university-wide, interdisciplinary teaching development project by the Faculty of Education at the University of Jyväskylä

2010–2016 Development of various interactive, peer-instructive teaching methods at the University of Jyväskylä

OTHER KEY ACADEMIC MERITS

- 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).
- Journal refereeing for Physical Review B, Physical Review Letters, Physical Review Research, Physical Review Applied, Nanoscale, Nano Letters, Physica Status Solidi B, Journal of Applied Physics, Transactions on Nanotechnology, and Journal of Computational Electronics
- Co-organizing an international conference: Progress in Nonequilibrium Green's Functions V, Jyväskylä (2012)
- Co-editing a conference proceedings: Progress in Nonequilibrium Green's Functions V, Journal of Physics: Conference Series, IOP Publishing (2013)
- Member of the scientific advisory board for ETSF Young Researchers' Meeting, Hamburg (2018)
- Co-hosting a stand on Michelson interferometer and a laser game at a science festival ("Sommer des Wissens"), Hamburg (2019)
- Co-hosting a stand on a computer game about protein folding at the DESY Open Day ("Nacht des Wissens"), Hamburg (2017)
- Maintaining the web page of the research group: Theoretical and computational nanoscience, University of Jyväskylä (2012–2016)

LANGUAGE SKILLS

- Finnish: native speaker
- English: highly proficient in both spoken and written English
- Swedish: working knowledge
- German: working knowledge

Updated: December 27th, 2021