

PERSONAL INFORMATION

Veljko Janković

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Gender Male | Date of birth 23 September 1990, Belgrade | Nationality Serbian

EDUCATION AND TRAINING

November 2014 – December 2018

Doctoral Studies in Physics

Faculty of Physics, University of Belgrade, Serbia

- specialization: condensed matter physics
- the thesis entitled “Exciton Dynamics at Photoexcited Organic Heterojunctions” defended in December 2018
- thesis advisor: Dr Nenad Vukmirović, Research Professor, Institute of Physics Belgrade
- the thesis was awarded the Student Prize for the best doctoral thesis completed at Institute of Physics Belgrade during 2018

October 2013 – June 2014

Master of Science in Physics

Faculty of Physics, University of Belgrade, Serbia

- specialization: condensed matter physics
- GPA 10.00/10.00
- the thesis entitled “Nonequilibrium Optical Conductivity in Systems with Localized Electronic States” defended in June 2014
- thesis advisor: Dr Nenad Vukmirović, Research Professor, Institute of Physics Belgrade
- the thesis was awarded “Prof. Dr. Ljubomir Ćirković” prize for the best MSc thesis defended at the Faculty of Physics during the academic year 2013/14

October 2009 – July 2013

Bachelor of Science in Physics

Faculty of Physics, University of Belgrade, Serbia

- specialization: theoretical and experimental physics
- GPA 9.97/10.00
- academic year 2011/12: the prize “Prof. Dr. Djordje Živanović” for one of the best third-year students at the Faculty of Physics

WORK EXPERIENCE

July 2024 – present

Associate Research Professor

**Scientific Computing Laboratory, Center for the Study of Complex Systems
Institute of Physics Belgrade, University of Belgrade, Serbia**

specific research interests

- development of numerically exact and approximate methods for dynamical properties of interacting quantum many-body systems
- nonequilibrium dynamics of photoinduced electronic excitations in semiconductors and their heterostructures
- light-to-charge conversion in organic solar cells on a variety of time and length scales
- primary processes in photosynthetic solar energy conversion (excitation energy transfer and charge separation)
- theory of open quantum systems
- theory of ultrafast nonlinear spectroscopies

June 2019 – June 2024

Assistant Research Professor

**Scientific Computing Laboratory, Center for the Study of Complex Systems
Institute of Physics Belgrade, University of Belgrade, Serbia**

February 2019 – March 2020 **Postdoctoral Position**

**Theoretical Division, Institute of Physics, Faculty of Mathematics and Physics
Charles University, Prague, Czech Republic**

Molecular Open Quantum Systems group

group leader: Dr Tomáš Mančal

specific research lines

- nonequilibrium photoinduced dynamics in light-harvesting molecular aggregates
- development of a new picture of the photosynthetic electronic energy transfer that is compatible with the conditions *in vivo*
- relating the newly developed picture with results emerging from ultrafast spectroscopy experiments

November 2014 – May 2019 **Research Assistant**

**Scientific Computing Laboratory, Center for the Study of Complex Systems
Institute of Physics Belgrade, University of Belgrade, Serbia**

Academic year 2013/14 – 2019/20 **External Collaborator**

Faculty of Physics, University of Belgrade, Serbia

Junior Teaching Assistant

- academic year 2019/20 (spring term) **Condensed Matter Theory**
lecturer Dr Darko Tanasković
- academic year 2014/15–2018/19 (winter term) **Quantum Statistical Physics**
lecturers Doc. Dr Mihajlo Vanević, Prof. Dr Zoran Radović, and Dr Milica Milovanović
- academic year 2013/14 (spring term) **Theoretical Mechanics**
lecturer Prof. Dr Sunčica Elezović-Hadžić

PARTICIPATION IN RESEARCH PROJECTS

January 2024 – present **Serbian Science Fund PRISMA Project PolMoReMa, Grant No. 5468**

“Polaron Mobility in Model Systems and Real Materials”

Leader of Work Package 1 “Model Hamiltonians”

Serbian Science Fund, Call PRISMA

PI: Dr Nenad Vukmirović, Research Professor, Institute of Physics Belgrade

October 2023 – December 2023 **Czech Science Foundation Project No. 22-26376S**

“Intramolecular vibrational modes as structural probes and dynamic modulators of biological and bio-inspired nanostructures”

Czech Science Foundation (GAČR)

PI: Prof. Dr Tomáš Mančal, Associate Professor, Charles University

November 2020 – August 2022 **Serbian Science Fund PROMIS Project Key2SM, Grant No. 6066160**

“Cold Atoms, Hubbard Model and Holography: Key to Strange Metals”

Serbian Science Fund, Program for Excellent Projects of Young Researchers (PROMIS2019)

PI: Dr Jakša Vučičević, Associate Research Professor, Institute of Physics Belgrade

November 2014 – December 2019 **National Project ON171017**

“Modeling and Numerical Simulations of Complex Many-Particle Systems”

Ministry of Education, Science, and Technological Development of the Republic of Serbia

subproject headed by Dr Nenad Vukmirović, Research Professor, Institute of Physics Belgrade

- February 2019 – March 2020 **Czech Science Foundation Project No. 17-22160S**
“Quantum theory of excitation energy transfer and advanced optical spectroscopy: from small dye molecules to light-harvesting complexes”
Czech Science Foundation (GAČR)
PI: Prof. Dr Tomáš Mančal, Associate Professor, Charles University
- February 2019 – March 2020 **Charles University Research Center Program No. UNCE/SCI/010**
Center of Nano- and Bio-Photonics
research within the subproject headed by Prof. Dr Tomáš Mančal, Charles University
- October 2013 – August 2015 **European Commission FP7 Project**
“Electronic Transport in Organic Materials” (ELECTROMAT)
principal investigator: Dr Nenad Vukmirović, Research Professor, Institute of Physics Belgrade

PERSONAL SKILLS

Mother tongue Serbian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C1	C2
Certificate in Advanced English (CAE) C1					
Italian	C1	C1	C1	C1	B2
Attestato rilasciato dall'Istituto di lingue straniere di Belgrado (esame di livello B2.2)					
Czech	A2	A2	A2	A2	A2
Osvědčení vydal Ústav jazykové a odborné přípravy Univerzity Karlovy					

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
[Common European Framework of Reference for Languages](https://europa.eu/europass/levels)

Computer skills

- operating systems – Linux, Windows
- programming – C (competent), Fortran (basic), python (basic)
- scripting languages – bash, awk, PHP
- basic experience with HTML
- basic experience with HPC resources (basics of parallelization using MPI)

ADDITIONAL INFORMATION

Schools Participated in The 5th CECAM Summer School on Atomistic Simulation Techniques for Material Science, Nanotechnology, and Biophysics (Trieste, Italy, June–July 2014)

Scientific Collaborations Member of the COST Action MP1406 “MultiscaleSolar” (2015–2019)

Physics Competitions

- member of the National High-School-Physics Competitions Committee
- years active 2012/13, 2015/16–2017/18
- one of the authors of theoretical problems for the final-year high-school students
- one of the leaders of the Serbian national team at The 5th Romanian Master of Physics (Bucharest, Romania, February 2016)
- one of the leaders of the Serbian national team at The 48th International Physics Olympiad (Jogjakarta, Indonesia, July 2017)
- one of the leaders of the Serbian national team at The 49th International Physics Olympiad (Lisbon, Portugal, July 2018)

RESEARCH PAPERS

15. V. Janković, P. Mitrić, D. Tanasković, and N. Vukmirović, "Vertex Corrections to Conductivity in the Holstein Model: A Numerical-Analytical Study", *Phys. Rev. B* **109**, 214312 (2024).
14. V. Janković, "Holstein Polaron Transport from Numerically "Exact" Real-Time Quantum Dynamics Simulations", *J. Chem. Phys.* **159**, 094113 (2023). (part of the 2023 JCP Emerging Investigators Special Collection)
13. P. Mitrić, V. Janković, N. Vukmirović, and D. Tanasković, "Cumulant Expansion in the Holstein Model: Spectral Functions and Mobility", *Phys. Rev. B* **107**, 125165 (2023).
12. V. Janković and J. Vučićević, "Fermionic-propagator and Alternating-basis Quantum Monte Carlo Methods for Correlated Electrons on a Lattice", *J. Chem. Phys.* **158**, 044108 (2023).
11. P. Mitrić, V. Janković, N. Vukmirović, and D. Tanasković, "Spectral Functions of the Holstein Polaron: Exact and Approximate Solutions", *Phys. Rev. Lett.* **129**, 096401 (2022).
10. V. Janković and N. Vukmirović, "Spectral and thermodynamic properties of the Holstein polaron: Hierarchical equations of motion approach", *Phys. Rev. B* **105**, 054311 (2022).
9. W. Kaiser, V. Janković, N. Vukmirović, and A. Gagliardi, "Nonequilibrium Thermodynamics of Charge Separation in Organic Solar Cells", *J. Phys. Chem. Lett.* **12**, 6389 (2021).
8. V. Janković and T. Mančal, "Nonequilibrium Steady-State Picture of Incoherent Light-Induced Excitation Harvesting", *J. Chem. Phys.* **153**, 244110 (2020).
7. V. Janković and T. Mančal, "Exact Description of Excitonic Dynamics in Molecular Aggregates Weakly Driven by Light", *J. Chem. Phys.* **153**, 244122 (2020).
6. V. Janković and N. Vukmirović, "Energy–Temporal Pathways of Free-Charge Formation at Organic Bilayers: Competition of Delocalization, Disorder, and Polaronic Effects", *J. Phys. Chem. C*, **124**, 4378 (2020).
5. V. Janković and N. Vukmirović, "Combination of Charge Delocalization and Disorder Enables Efficient Charge Separation at Photoexcited Organic Bilayers", *J. Phys. Chem. C*, **122**, 10343 (2018).
4. V. Janković and N. Vukmirović, "Identification of Ultrafast Photophysical Pathways in Photoexcited Organic Heterojunctions", *J. Phys. Chem. C* **121**, 19602 (2017).
3. V. Janković and N. Vukmirović, "Origin of Space-Separated Charges in Photoexcited Organic Heterojunctions on Ultrafast Time Scales", *Phys. Rev. B* **95**, 075308 (2017).
2. V. Janković and N. Vukmirović, "Dynamics of Exciton Formation and Relaxation in Photoexcited Semiconductors", *Phys. Rev. B* **92**, 235208 (2015).
1. V. Janković and N. Vukmirović, "Nonequilibrium Optical Conductivity in Materials with Localized Electronic States", *Phys. Rev. B* **90**, 224201 (2014).

PARTICIPATION IN INTERNATIONAL CONFERENCES

22. (oral) V. Janković and N. Vukmirović: "A Nonequilibrium-Thermodynamics Perspective on Charge Separation in Organic Solar Cells", The 21st Symposium on Condensed Matter Physics (SFKM 2023), Belgrade - Serbia, 26 - 30 June 2023, Book of Abstracts, p. 61 (2023).
21. (oral) P. Mitrić, V. Janković, N. Vukmirović, and D. Tanasković: "Cumulant Expansion in the Holstein Model: Spectral Functions and Mobility", The 21st Symposium on Condensed Matter Physics (SFKM 2023), Belgrade - Serbia, 26 - 30 June 2023, Book of Abstracts, p. 67 (2023).
20. (oral) P. Mitrić, V. Janković, N. Vukmirović, and D. Tanasković, "Spectral Functions of the Holstein Polaron: Exact and Approximate Solutions", The 11th International Conference of the Balkan Physical Union (BPU11 Congress), 28 August - 1 September 2022, Belgrade, Serbia, Book of Abstracts, p. 106 (2022).
19. (poster) V. Janković and J. Vučićević, "Alternating-Basis Quantum Monte Carlo Method for Strongly Correlated Electrons", The 11th International Conference of the Balkan Physical Union (BPU11 Congress), 28 August - 1 September 2022, Belgrade, Serbia, Book of Abstracts, pp. 118–119 (2022). (awarded as one of the best posters presented in the condensed-matter section of the conference)
18. (oral) V. Janković and N. Vukmirović, "Finite-Temperature Dynamical Properties of the Holstein Model: Hierarchical Equations of Motion Approach", The 11th International Conference of the Balkan Physical Union (BPU11 Congress), 28 August - 1 September 2022, Belgrade, Serbia, Book of Abstracts, p. 103 (2022).
17. (oral) V. Janković, "Incoherent Light-Induced Excitation Harvesting in Molecular Energy-Conversion Systems", The 12th Workshop on Quantum Effects in Biological Systems (QuEBS), 06-10 June 2022, Heraklion, Greece, Book of Abstracts, pp. 20–21 (2022).
16. (oral) V. Janković, "Relevance of Incoherent Light-Induced Coherences for Photosynthetic Energy Transfer", The 8th International School and Conference on Photonics, 23–27 August 2021, Belgrade, Serbia, Book of Abstracts, p. 185 (2021).
15. (poster) V. Janković and N. Vukmirović, "Energy-Temporal Pathways of Free-Charge Formation at Organic Bilayers: Competition of Delocalization, Disorder, and Polaronic Effects", On-line Workshop on Excited Charge Dynamics in Semiconductors organized by the International Center for Theoretical Physics, Trieste, Italy, 28–30 September 2020.
14. (poster) V. Janković and T. Mančal, "A Step towards a Comprehensive Steady-State Picture of Photosynthetic Solar Energy Conversion", Quantum Effects in Biological Systems (QuEBS) 2019, Puebla, Mexico, 27–31 October 2019, Book of Abstracts, p. 26 (2019).
13. (poster) V. Janković and T. Mančal, "A Step towards a Comprehensive Steady-State Picture of Photosynthetic Solar Energy Conversion", The 20th Symposium on Condensed Matter Physics (SFKM), Belgrade, Serbia, 7–11 October 2019, Book of Abstracts, p. 38 (2019).
12. (oral) V. Janković and N. Vukmirović, "Light-to-Charge Conversion in Organic Photovoltaics: Mechanisms and Timescales", The 20th Symposium on Condensed Matter Physics (SFKM), Belgrade, Serbia, 7–11 October 2019, Book of Abstracts, p. 38 (2019).
11. (invited oral) V. Janković and N. Vukmirović, "Mechanisms and time scales of free-charge generation in organic photovoltaics: hot and fast or cold and slow", The 7th International School and Conference on Photonics, 26–30 August 2019, Belgrade, Serbia, Book of Abstracts, p. 44 (2019).

**PARTICIPATION IN
INTERNATIONAL CONFERENCES**

10. (oral) V. Janković and N. Vukmirović, "Some Like It Hot, Others Prefer It Cold: Mechanism of Free-Charge Generation in Organic Photovoltaics", COST Action MP1406 Workgroup Meeting *MultiscaleSolar-Marseille-2018*, Aix-Marseille Université, Marseille, France, 13–14 September 2018.
9. (invited oral) V. Janković and N. Vukmirović, "Dynamics of Photoexcited Charges in Organic Heterojunctions – Insights from Theory and Simulation", The 18th IEEE International Conference on Nanotechnology, Cork, Ireland, 23–26 July 2018.
8. (oral) V. Janković and N. Vukmirović, "Importance of Carrier Delocalization and Disorder for Incoherent Charge Separation at Organic Bilayers", E-MRS Spring Meeting 2018, 18–22 June 2018, Strasbourg Convention Center, Strasbourg, France, oral contribution J12.7 (2018).
7. (poster) V. Janković and N. Vukmirović, "Origin of Space-Separated Charges in Photoexcited Organic Heterojunctions on Subpicosecond Time Scales", The 6th International School and Conference on Photonics, 28 August–1 September 2017, Belgrade, Serbia, Book of Abstracts, p. 164 (2017).
6. (poster) V. Janković and N. Vukmirović, "Origin of Space-Separated Charges in Photoexcited Organic Heterojunctions on Ultrafast Time Scales", Workshop on Spectroscopy and Dynamics of Photoinduced Electronic Excitations, International Center for Theoretical Physics, Trieste, Italy, 8–12 May 2017.
5. (poster) V. Janković and N. Vukmirović, "Exciton Formation and Relaxation Dynamics in Photoexcited Organic Semiconductors and Their Heterojunctions: Numerical Study", Gordon Research Conference Electronic Processes in Organic Materials, Barga (Lucca), Italy, 5–10 June 2016, Poster Presentation 41 (2016).
4. (poster) V. Janković and N. Vukmirović, "Nonequilibrium Electrical Transport in Materials with Localized Electronic States", The 26th International Conference on Amorphous and Nanocrystalline Semiconductors, Aachen, Germany, 13–18 September 2015, Book of Abstracts, p. 72 (2015).
3. (poster) V. Janković and N. Vukmirović, "Nonequilibrium High-Frequency Conductivity in Materials with Localized Electronic States", The 19th Symposium on Condensed Matter Physics (SFKM), Belgrade, Serbia, 7–11 September 2015, Book of Abstracts, p. 88 (2015).
2. (poster) V. Janković and N. Vukmirović, "Nonequilibrium Terahertz Conductivity in Systems with Localized Electronic States", EDISON 19, 29 June–2 July 2015, Salamanca, Spain, Book of Abstracts, p. 125 (2015).
1. (poster) V. Janković and N. Vukmirović, "Nonequilibrium Terahertz Conductivity in Materials with Localized Electronic States", Nanoscale Quantum Optics-Kick off Workshop, 9–10 April 2015, Belgrade, Serbia, Book of Abstracts, p. 55 (2015).