

Curriculum vitae

Oleh V. Ivakhnenko



Date of birth: September 24, 1995

Citizenship: Ukraine

E-mail: olegiv333@gmail.com

Work:

11.2023-present: RIKEN, Wako-shi, Japan.

Department: Cluster for Pioneering Research

Laboratory: Theoretical Quantum Physics Laboratory

Position: Postdoctoral Researcher

Education:

Graduate:

11.2019-11.2023: B.Verkin Institute for Low Temperature Physics and Engineering
of the National Academy of Sciences of Ukraine, Kharkiv (Ukraine),

Department: Department of Superconducting and Mesoscopic Structures,

Degree: Doctor of Philosophy in Physics

Undergraduate:

09.2017-05.2019: V. N. Karazin Kharkiv National University, Kharkiv (Ukraine),

Faculty: Physics and Technology, Akhiezer Department of Theoretical Nuclear Physics and
Higher Mathematics

Degree: Master in Physics

Thesis: "Landau-Zener-Stückelberg-Majorana transitions for interferometry and quantum
control"

(supervisor: DSc S. N. Shevchenko, ILTPE)

09.2013-06.2017: V. N. Karazin Kharkiv National University, Kharkiv (Ukraine),

Faculty: Physics and Technology, Akhiezer Department of Theoretical Nuclear Physics and Higher Mathematics.

Degree: Bachelor in Physics

Thesis: “Dynamics of membrane for creation of memcapacitance”

(supervisor: DSc S. N. Shevchenko, ILTPE)

School:

05.2013: graduated from Kupyansk gymnasium № 3, Kupyansk, Kharkiv region (Ukraine).

Language: Ukrainian, Russian, English.

Schools and Conferences:

28.05.2014-30.05.2014 The first course developed program for simulation of a process evident in ideal and nonideal gases. What is demonstrated on the conference “Computer Modeling in Science Intensive Technologies” in V. N. Karazin Kharkiv National University, + Oral presentation “MODELING BEHAVIOR OF IDEAL GAS” O.V. Ivakhnenko.

29.02.2016-02.03.2016 Winter School of High Energy Physics, V. N. Karazin Kharkiv National University.

07.10.2016-14.10.16 International school & conference on nanoscience and quantum transport, Kyiv(Ukraine),+poster: “Simulating quantum dynamical phenomena by the mechanical resonator” O.V. Ivakhnenko and S.N. Shevchenko

25.11.2016 Student conference on Applied Physics "Actual problems of modern physics" Physics and technology Faculty Kharkiv National University V.N. Karazin, + poster: “Interferometry with nanomechanical resonator” O.V. Ivakhnenko and S.N. Shevchenko

29.05.2017-02.06.2017 “VIII International Conference for Professionals & Young Scientists” B. Verkin Institute for Low Temperature Physics and Engineering Kharkiv(Ukraine)+ poster: “Dynamics of buckled membranes for memcapacitor applications”

11.09.2017-15.09.2017 Autumn school of modern quantum physics «Introduction to quantum technologies» , M. Bogolyubov institute of theoretical physics National Academy of Sciences of Ukraine(Kyiv)

24.11.2017 Student conference on Applied Physics "Actual problems of modern physics" Physics and technology Faculty Kharkiv National University V.N. Karazin, + talk: “Elastic dynamics of the membrane to create the memcapacitors” O.V. Ivakhnenko and S.N. Shevchenko

13.12.2017-17.12.2017 Winter school on Quantum Condensed-matter Physics, Condensed-matter physics Laboratory at the Higher School of Economics in Moscow(Russia)+poster: "Simulating quantum dynamical phenomena using classical oscillators" O.V. Ivakhnenko, S.N. Shevchenko and Franco Nori.

04.06.2018-08.06.2018 International Conference for Professionals & Young Scientists, B. Verkin Institute for Low Temperature Physics and Engineering of the NASU(Kharkiv, Ukraine)+ Oral presentation "Landau-Zener-Stückelberg-Majorana interferometry, latching modulation, and motional averaging – dynamical quantum phenomena simulated by coupled classical oscillators" O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

10.09.2018-14.09.2018 Summer School and Conference for Young Researchers on Modern Quantum Technologies +poster "Snap-through transition of graphene membranes for memcapacitor applications using elastic theory" Ruslan D. Yamaletdinov, Oleg V. Ivakhnenko, Olga V. Sedelnikova, Sergey N. Shevchenko, Yuriy V. Pershin.

14.11.2018 The All-RIKEN Workshop 2018, Wako (Japan) + poster "Classical simulation of seemingly quantum phenomena" O. V. Ivakhnenko, S. N. Shevchenko, and Franco Nori.

18.11.2019-22.11.2019 International School and Symposium on Nanoscale Transport and phoTonics 2019, Atsugi (Japan) + poster "Coupled mechanical resonators behave similar to qubits", O. V. Ivakhnenko, S. N. Shevchenko, and Franco Nori.

8-14.06.2020 International Advanced Study Conference «Condensed Matter and Low Temperature Physics 2020» CM<P 2020 Kharkiv (Ukraine, Online)+ Oral presentation "Comparison of approaches for description of driven qubits" O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

21-23.12.2020 XI Conference of Young Scientists "Problems of Theoretical Physics" Kyiv (Ukraine, Online) + Oral presentation "Occupation-conservation transition in a quantum two-level system" O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

15-19.03.2021 APS March Meeting 2021, (USA, Online) + Poster "Coupled mechanical resonators behave similar to qubits", O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

14-17.12.2021 International Symposium on Novel maTerials and quantum Technologies 2021, Atsugi (Japan, Online) + poster "Ultrafast Landau-Zener-Stückelberg-Majorana (LZSM) gates", O. V. Ivakhnenko, S. N. Shevchenko, and Franco Nori.

14-18.03.2022 APS March Meeting 2022, Chicago (USA, Online) + Oral presentation "Landau-Zener-Stuckelberg-Majorana transitions for interferometry and quantum control", O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

18-24.08.2022 "29th International Conference on LOW TEMPERATURE PHYSICS" LT29, Sapporo (Japan, Online) + poster "Landau-Zener-Stückelberg-Majorana transitions for fast quantum logic gates", O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

12-13.12.2022 "The RIKEN-CPR Physics Workshop for Students", + oral talk "Interference phenomena with Landau-Zener-Stückelberg-Majorana (LZSM) transitions", O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

20-22.03.2023 APS March Meeting 2023, Las Vegas (USA, Online) + Oral presentation “Nonadiabatic Landau-Zener-Stückelberg-Majorana transitions dynamics, and interference”, O. V. Ivakhnenko, S. N. Shevchenko, and F. Nori

5-11.06.2023 III International conference Condensed Matter & Low Temperature Physics (CM<P 2023), B.Verkin Institute for Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine (online) + oral talk “Optimization of fast nonadiabatic single-qubit logic gates”, O. V. Ivakhnenko, A. I. Ryzhov, S. N. Shevchenko, and Franco Nori.

6-7.09.2023 RIKEN Summer School 2023 + poster “Fast non-adiabatic quantum logic gates” O. V. Ivakhnenko, A. I. Ryzhov, S. N. Shevchenko, and Franco Nori.

Internships:

14.06.2017-03.07.2017 Intern on RIKEN’s Internship Program in RIKEN (Japan)

16.06.2018-04.08.2018 Intern on RIKEN’s Internship Program in RIKEN (Japan)

01.11.2018-30.04.2019 Intern on RIKEN IPA Program in RIKEN (Japan)

10.11.2019-30.11.2019 Intern on RIKEN’s Internship Program in RIKEN (Japan)

02.06.2022-31.10.2023 Intern on RIKEN IPA Program in RIKEN (Japan)

Publications:

Parametric excitation of azimuthally nonsymmetric surface waves propagating in metal waveguides filled with isotropic plasma, V. O. Girka, I. O. Girka, R. D. Sydora, O. Ivahnenko, and Y. Shkoda, Phys. Scr. **90** (2015) 065605 (7pp).

Snap-through transition of buckled graphene membranes for memcapacitor applications, R. D. Yamaletdinov, O. V. Ivakhnenko, O. V. Sedelnikova, S. N. Shevchenko, Y. V. Pershin, Scientific Reports **8**, 3566 (2018).

Simulating quantum dynamical phenomena using classical oscillators: Landau-Zener-Stückelberg-Majorana interferometry, latching modulation, and motional averaging, O. V. Ivakhnenko, S. N. Shevchenko & Franco Nori, Scientific Reports **8** 12218(2018)

Landau-Zener-Stückelberg-Majorana interferometry of a superconducting qubit in front of a mirror, P.Y. Wen, O.V. Ivakhnenko, M.A. Nakonechnyi, B. Suri, J-J Lin, W-J Lin, J.C. Chen, S.N. Shevchenko, Franco Nori, I-C Hoi, Physical Review B, **102**, 075448 (2020)

Majorana's approach to nonadiabatic transitions validates the adiabatic-impulse approximation, P. O. Kofman, O. V. Ivakhnenko, S. N. Shevchenko, Franco Nori, Sci. Rep. **13**, 5053 (2023).

Nonadiabatic Landau–Zener–Stückelberg–Majorana transitions, dynamics, and interference, O. V. Ivakhnenko, S. N. Shevchenko, Franco Nori, Physics Reports **995**, (2023) (1-89pp.)

Alternative fast quantum logic gates using nonadiabatic Landau-Zener-Stückelberg-Majorana transitions, O. V. Ivakhnenko, A. I. Ryzhov, S. N. Shevchenko, and Franco Nori
arXiv:2310.17932 (2023)

Research work:

Currently, I am enrolled in the research work within PostDoc position in RIKEN Theoretical Quantum Physics Laboratory under the supervision of Prof. Franco Nori.

Hobby:

Programming, physics, cycling, badminton, hiking.

Achievements:

2010-2013: Many times I participated in the school olympiads in physics, computer science, chemistry, has prizes at regional level

04.2013: third place at the all-Ukrainian competition in informatics

05.2013: diploma of best school-leaver of Kharkiv region.

9-12.2016: participation in the Grant of President of Ukraine (head: Dr. S.N. Shevchenko)

03.2018: third place at the all-Ukrainian competition of student research works.

11.2018-04.2019: participation in the RIKEN International Program Associate (IPA scholarship).

30.03.2019: Prize for young scientists and students of higher educational institutions for the best scientific work, National Academy of Science Ukraine.