

prof. dr. Rok Žitko

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F-1 - Theoretical physics

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Foto: Marjan Verč

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Personal web site: auger.ijs.si/nano/ (full annotated bibliography, research and teaching activities, and software projects)

Born 12. 4. 1978 in Ljubljana, Slovenia.

Current positions:

2021-: Research councillor ("znanstveni svetnik") at F1, Department of Theoretical Physics, Jožef Stefan Institute, JSI (full time)

2023-: Full professor ("redni profesor") at the Faculty for Mathematics and Physics, University of Ljubljana, UL FMF (part time)

Employments:

2023: Full professor at UL FMF

2021: Research councillor at F1 JSI

2017: Assoc. professor at UL FMF

2016: Senior research fellow at F1 JSI

2012: Assist. professor at UL FMF

2011: Research fellow at F1 (Theoretical physics) JSI

2009: Assistant with PhD at F5 JSI

2009: Assistant at UL FMF

2008: Postdoctoral fellow, Institute for theoretical physics at University of Göttingen, Germany

2003-2007: Research assistant at F5 (Condensed matter physics) JSI

Education, research stays:

2021: Visiting scientist, Niels Bohr Institut, University of Copenhagen (1 month)

2008: Postdoctoral fellow, Uni. Göttingen (with prof. Thomas Pruschke)

2007: Doctor's degree, UL FMF

2002: Bachelor's degree, UL FMF

Awards and grants:

2022: "Zoisovo priznanje" (Zois distinction) for developing the theory of nanoscopic quantum systems

2022-: P1-0416 "Physics of quantum technologies", research programme funded by Slovenian research agency (ARRS), 2.5 FTE for three years, programme leader Rok Žitko

2021-2024: V1-2119 "Cryptographically safe random number generator", research project funded by National security agency (UVTP) and Slovenian research agency (ARRS), 1.6 FTE for three years, PI Rok Žitko

2021-2024: J1-3008 "Coulombic subgap states in superconducting quantum devices", research project funded by Slovenian research agency (ARRS), 1.2 FTE for three years, PI Rok Žitko

2016-2018: J1-7259 "The multi-impurity problem", research project funded by Slovenian research agency (ARRS), 1,3 FTE for three years, PI Rok Žitko

2009-2011: Z1-2058 "Single magnetic atoms and magnetic nanostructures on metal surfaces", postdoctoral project funded by Slovenian research agency (ARRS), 1 FTE for two years, PI Rok Žitko

2008: "Zlati znak Jožefa Stefana" award for outstanding contributions made to science in the Doctoral thesis

2002: "Univerzitetna Prešernova nagrada" award for undergraduate students

Teaching:

2013-: Lectures "Computer technologies" at the Faculty for computer science and informatics, UL

2009-2013: Teaching assistant: Experimental Lab 3, Dynamical systems, Classical mechanics; UL FMF

2008: Teaching assistant: Introduction to programming in natural sciences; Univ. of Göttingen, Germany

Supervised 8 master theses (Don Rolih, Luka Pavešič, Amina Alić, Nejc Rozenstein, Marion van Midden, Tina Arh, Tadej Mežnaršič, Žiga Osolin) and 1 diploma thesis (Marjan Maček)

Supervision of graduate students:

2022-: Don Rolih, UL FMF

2021-: Katja Gosar, UL FMF (coadvisor; advisor dr. Peter Jeglič)

2019-: Luka Pavešič, UL FMF

2017-2022: Tadej Mežnaršič, UL FMF (coadvisor; advisor dr. Peter Jeglič)

2012-2016: Žiga Osolin, UL FMF

2012-2014: Denis Golež, UL FMF (coadvisor; advisor prof. dr. Janez Bonča)

Current research projects:

- Physics of subgap states in nanostructures coupled to superconducting contacts. Modelling of experimental devices. Method development for charge-conserving superconductor model Hamiltonians. Coupling to microwave resonators, transmons, circuit quantum electrodynamics
- Quantum impurity physics, numerical renormalization group, magnetic anisotropy, spin-orbit coupling, multi-orbital and multi-channel problems
- Cold-atom physics, Bose-Einstein condensates, mean-field description, interaction modulation effects (Bose fireworks physics)
- Quantum physics & device applications, true random number generators (classical and quantum)
- Heterogeneous strongly correlated systems and ensembles of many impurities. Real-space DMFT and effective impurity-impurity coupling
- Transport properties of strongly correlated electron systems

Institutional responsibilities:

- 2023-: Member of the Scientific council (Znanstveni svet) of JSI.
- 2020-: Coordinator for the topic of Quantum simulations within QUTES, Slovenian interest group on quantum technologies
- 2011-: Responsible for high performance computing facilities of the department F1 at JSI; this involves planning expansions, integrating systems, managing computing, storage and network elements (4000 CPU cores, 1+ PB storage capacity on ZFS and Ceph, 40/100 GbE & Infiniband HDR100 network), infrastructure (cooling, power distribution), and software stack (CentOS, Rocks cluster, Slurm, Lmod, Singularity, EasyBuild, toolchains). Successful applications for ARRS cofunding: packages 17, 18, 19, 20.

Commissions of trust:

- 2022-: chair of the Slovenian Committee for physics, Association of Mathematicians, Physicists and Astronomers of Slovenia (DMFA Slovenije)
- 2019-: deputy member of Quantum Community Network (QCN) representing Slovenia in EU Quantum Flagship project.
- 2018: evaluator for Marie Skłodowska Curie Individual Fellowships
- 2016, 2021: Project application evaluator for DFG (Germany)
- 2016: Project application evaluator for HRZZ (Croatia)
- 2016: PhD thesis external examiner for A. Jellinggaard, Niels Bohr Institut, University of Copenhagen, Denmark
- 2013: Project application evaluator for Comision Nacional de Investigacion Cientifica y Tecnologica, Chile
- 2012, 2013, 2019: PhD thesis external examiner for P. Baruselli, Z. Asadzadeh, D. Karki, SISSA, Trieste, Italy
- 2007-: Reviewer for Phys. Rev. Lett. and Phys. Rev. B (about 10 papers per year), occasionally other journals (Nano Letters, Nature, Nature Nanotech., Eur. Phys. Lett., Scientific Reports, J. Phys.: Condens. Matter, New J. Phys., Communications Physics)

Collaborations:

- Multiple ongoing projects with local experimental groups at Jozef Stefan Institute (P. Jeglič, E. Zupanič, M. Klanjšek, A. Zorko, D. Arčon, D. Mihailović)
- J. Paaske, G. Steffensen, J. Nygard, K. Grove-Rasmusen, J. C. Estrada Saldana (QDev, NBI, Copenhagen): hybrid superconductor-semiconductor devices
- F. Malinowski, C. Prosko, J. Koski (TU Delft), A. Palyi (BME Budapest): reflectometry on hybrid devices
- A. Bargerbos, M. Pita-Vidal (TU Delft), B. van Heck (Microsoft), R. Aguado (ICMM CSIC Madrid): transmons with nanowire junctions
- D. Tanasković, J. Vučićević, IP Belgrade: superconductivity and strong correlation physics, orbital magnetic response in correlated systems, transport properties

Organization of scientific events:

- Yearly meeting of the members of Slovenian society of mathematicians, physicists and astronomers (Občni zbor DMFA Slovenije), 11 Nov 2022
- BOSSA - Bound states in superconductors and interfaces, MPIPKS, Dresden, Germany, 8-10 Apr 2019
- NGSCES - New generation in strongly correlated electron systems, Trogir, Croatia, 14-18 Sep 2015

Public engagement

- Podobe znanja (radio), interview, Mar 2023
- Frekvenca X (radio/podcast), three-part series on QT, Jan 2021
- European Quantum Week - public lecture on QT, Nov 2020
- Frekvenca X (radio/podcast), interview on semiconductor chips, Sep 2020
- Ugriznimo znanost (TV), guest, topology in physics, 2016
- Intelekta (radio), interview, 2016
- Portal STAznanost, interview, 2015

Total number of publications: 108 (59 PRB, 13 PRL, 3 NJP, 3 PRA, 2 Nat. Phys., 3 Nat. Commun., 2 Nano Lett., 1 Sci. Adv.)

Citations: 3510 (h-index 34); Google Scholar, as of 28. 2. 2023