# CV Juraj Krsnik

## Personal Data


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| Place and Date of Birth: | Zagreb, Republic of Croatia \| 28 December 1994 |
| email: | jkrsnik@ifs.hr |


## Education

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|---|---|
| 22 September 2022 | PhD in Condensed Matter Theory, Department of Physics, Faculty of Science, University of Zagreb<br>Thesis: "Manifestations of strong correlations and disorder in selected problems of condensed matter physics" |
| 10 July 2018 | Master of Science in Physics, Department of Physics, Faculty of Science, University of Zagreb<br>Thesis: "Many-body localization: Long-time charge-density correlations" |

## Work Experience

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|---|---|
| 2025 - present | research associate \| Institute of Physics, Zagreb |
| 2022 - 2024 | postdoctoral researcher \| TU Wien |
| 2018 - 2022 | research assistant \| Institute of Physics, Zagreb |

## Teaching Experience

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|---|---|
| 2022 - 2024 | lecturer \| TU Wien<br>- Quantum Field Theory for Many Body Systems: Lectures on RPA: 2022/23, 2023/24<br>- Computational Materials Science: Lectures on DΓA: 2023/24 |
| 2018 - 2022 | teaching assistant \| Department of Physics, Faculty of Science, University of Zagreb<br>- Solid State Physics 1: 2019/20, 2020/21, 2021/22<br>- Solid State Physics 2: 2018/19, 2019/20, 2020/21, 2021/22<br>- Selected Topics in Solid State Physics: 2018/19 |

## Participation in projects

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| 2023 - present | collaborator on the project Functional Complex Materials: Electronic Subsystems and Wave Functions, HrZZ IP-2022-10-3382, Faculty of Science, University of Zagreb |
| 2024 - 2025 | collaborator on the project Emerging universalities in systems with strong interactions, HrZZ IP-2022-10-9423, Institute pf Physics, Zagreb |
| 2022 - 2024 | collaborator on the project Vertex corrections to conductivity, FWF P36213, TU Wien |
| 2018 - 2022 | collaborator on the project The physics of many body systems - exploiting the world of complexity, HrZZ IP-2016-06-7258, Institute of Physics, Zagreb |

## Honors and Awards

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| 2017 - 2018 | scholarship of excellence for research oriented study physics students awarded by Institute of Physics, Zagreb |

## Reviewing

Physical Review Letter, Physical Review B, Physical Review E

## Languages

Croatian (mother tongue), English (excellent knowledge), German (basic knowledge)

## List of publications (Google Scholar, ORCID)

**11. J. Krsnik**, A. Kauch, and K. Held, "Analytical expression for $\pi$-ton vertex contributions to the optical conductivity", arXiv:2409.11158

**10. J. Krsnik** and K. Held, "Local correlations necessitate waterfalls as a connection between quasiparticle band and developing Hubbard bands", Nat. Commun. **16**, 255 (2025) arXiv:2408.12884.

**9. J. Krsnik**, D. Novko, and O. S. Barišić, "Superconductivity in two-dimensional systems enhanced by nonadiabatic phonon-production effects", Phys. Rev. B **110**, L180505 (2024), arXiv:2405.12554.

**8.** L. Si, E. Jacob, W. Wu, A. Hausoel, **J. Krsnik**, P. Worm, S. Di Cataldo, O. Janson, and K. Held, "Closing in on possible scenarios for infinite-layer nickelates: Comparison of dynamical mean-field theory with angular-resolved photoemission spectroscopy", Phys. Rev. Research **6**, 043104 (2024), arXiv:2408.12985.

**7. J. Krsnik**, O. Simard, P. Werner, A. Kauch, and K. Held, "Displaced Drude peak from $\pi$-ton vertex corrections", Phys. Rev. B **110**, 075118 (2024), arXiv:2402.16104.

**6.** Z. Rukelj, D. Radić, **J. Krsnik**, O. S. Barišić, A. S. Mishchenko, and I. Kupčić, "Dynamical conductivity of a two-dimensional weakly doped Holstein system", Phys. Rev. B **108**, 155151 (2023).

**5. J. Krsnik** and O. S. Barišić, "Importance of coupling strength in shaping electron energy loss and phonon spectra of phonon-plasmon systems", Phys. Rev. B **106**, 075207 (2022), arXiv:2112.07265.

**4.** X. Mettan, E. Martino, L. Rossi, J. Jaćimović, **J. Krsnik**, O. S. Barišić, N. Babcsán, S. Beke, R. Mokso, G. Kaptay, and L. Forró, "Acoustic-Pressure-Assisted Engineering of Aluminium Foams", Adv. Eng. Mater **23**, 2100306 (2021), arXiv:2103.15225.

**3.** P. Prelovšek, M. Mierzejewski, **J. Krsnik**, and O. S. Barišić, "Many-body localization as a percolation phenomenon", Phys. Rev. B **103**, 045139 (2021), arXiv:2010.12295.

**2. J. Krsnik**, I. Batistić, A. Marunović, E. Tutiš, and O. S. Barišić, "Exact solution of electronic transport in semiconductors dominated by scattering on polaronic impurities", Phys. Rev. B **102**, 241111(R) (2020), arXiv:2002.12833.

**1. J. Krsnik**, V. N. Strocov, N. Nagaosa, O. S. Barišić, Z. Rukelj, S. M. Yakubenya, and A. S. Mishchenko, "Manifestations of the electron-phonon interaction range in angle-resolved photoemission spectra", Phys. Rev. B **102**, 121108(R) (2020), arXiv:1911.10985.

## Conferences, Schools, and Workshops

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| 2024 | invited lecture at The Lennard-Jones Centre Discussion Group seminar<br>Cambridge, United Kingdom, 4 NOV 2024 (online)<br>Title: "Waterfalls: umbilical cords at the birth of Hubbard bands" |
| 2024 | talk at 73$^{\text{rd}}$ Annual Meeting of the Austrian Physical Society<br>Linz, Republic of Austria, 23 - 27 SEP 2024<br>Title: "Waterfalls: umbilical cords at the birth of Hubbard bands" |
| 2024 | talk at the APS March Meeting 2024<br>Minneapolis, USA, 3 - 8 MAR 2024<br>Title: "$\pi$-ton vertex corrections to optical conductivity in correlated low-dimensional metals" |

2024 | poster at QUAST Conference
New York, USA, 28 FEB- 1 MAR 2024
Title: “Displaced Drude peak from $\pi$-ton vertex corrections”

2023 | talk at 6th Grandmaster Early-Career Workshop in Physics
Cluj-Napoca, Romania, 3 - 8 SEP 2023
Title: “$\pi$-ton vertex corrections to optical conductivity in correlated low-dimensional metals”

2023 | poster at Correlations in Novel Quantum Materials
Stuttgart, Federal Republic of Germany, 24 - 28 JUL 2023
Title: “$\pi$-ton vertex corrections in weakly correlated low-dimensional systems”

2022 | talk at From Solid State to BioPhysics X: From Basic to Life Sciences
Cavtat, Republic of Croatia, 11 - 18 JUN 2022
Title: “The Role of the Electron-Phonon Interaction Strength in Shaping Spectra of Phonon-Plasmon Systems”

2021 | poster at Solid-State Science & Research 2021 (SCIRES 2021)
Zagreb, Republic of Croatia, 10 - 11 JUN 2021
Title: “Estimation of the screening of the electron-phonon interaction from ARPES spectra”

2021 | poster at 7th Les Houches School in Computational Physics: Dynamics of Complex Quantum Systems from Theory to Computation
Les Houches, French Republic, 12 - 23 APR 2021 (online)
Title: “Many-body localization as a percolation phenomenon”

2020 | talk at 5th Grandmaster Early-Career Workshop in Physics
Prague, Czech Republic, 8 - 11 SEP 2020
Title: “Estimation of the electron-phonon interaction range from ARPES spectra”

2019 | poster at the workshop on Polarons in the 21st Century
Vienna, Republic of Austria, 9 - 13 DEC 2019
Title: “Electron scattering and bound states in the presence of polaronic impurities”

2019 | poster at WE Heraeus workshop on Fermi surface and novel phases in strongly correlated electrons systems
Les Houches, French Republic, 13 - 18 OCT 2019
Title: “Many-body localization: Long-time charge-density correlations”

2019 | poster at Summer School on Advanced Materials and Molecular Modelling with Quantum ESPRESSO
Ljubljana, Republic of Slovenia, 15 - 20 SEP 2019
Title: “Electron scattering on polaronic impurities characterized by a strong electron-phonon coupling”

2019 | talk at 4th Grandmaster Early-Career Workshop in Physics
Split, Republic of Croatia, 1 - 7 SEP 2019
Title: “Electron scattering and bound states in the presence of polaronic impurities”

2019 | talk at Solid-State Science & Research 2019 (SCIRES 2019)
Zagreb, Republic of Croatia, 27 - 29 JUN 2019
Title: “Resonant electron scattering on polaronic impurities”

2018 | talk at 11th Scientific Meeting of the Croatian Physical Society
Beli Manastir, Republic of Croatia, 3 - 5 OCT 2018
Title: “Many-body localization: Long-time charge-density correlations”