

Academic CV

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Academic milestones and positions held (selected)

04/2022-	Professor, IST Austria, AT
02/2016-03/2022	Ass. Professor, IST Austria, AT
06/2012-01/2016	Group leader, Institute of Semiconductor and Solid State Physics (Head: Prof. Rastelli), Johannes Kepler University/Linz/AT
12/2010-05/2012	Group leader, Institute for Integrative Nanosciences (Head: Prof. Schmidt), IFW-Dresden/DE
12/2006-11/2010	Post-doc researcher, Laboratory of electronic transport and superconductivity, group of Dr. De Franceschi, CEA-Grenoble/FR
04/2008-05/2008	Research visitor in the group of Prof. Lieber, Harvard University/USA
2002-2006	Scientific Collaborator, Max-Planck Institute for Solid State Research (Head: Prof. Kern)
April 2006	PhD, University of Konstanz, DE
06/2001-05/2002	Research Assistant (Head: Dr. Falaras), Demokritos/Athens/GR

Main areas of research

Experimental condensed matter physics, Low temperature electronic transport through low dimensional structures, Hole spin physics, Hole spin-qubits, Spin-orbit interaction, Hybrid superconductor-semiconductor devices, Topological superconductivity, Andreev Physics, Majorana Physics, Superconducting resonators

Research Achievements

10 most important publications

1. M. Valentini, M. Borovkov, E. Prada, S. Marti-Sanchez, M. Botifoll, A. Hofmann, J. Arbiol, R. Aguado, P. San-Jose, and G. Katsaros, Majorana-like Coulomb spectroscopy in the absence of zero bias peaks, ArXiv: arXiv:2203.07829 (2022), doi: <https://arxiv.org/abs/2203.07829>
2. D. Jirovec, P. M. Mutter, A. Hofmann, A. Crippa, M. Rychetsky, D. L. Craig, J. Kukucka, A. Crippa, F. Martins, A. Ballabio, N. Ares, D. Chrastina, G. Isella, G. Burkard, and G. Katsaros, Dynamics of hole singlet triplet qubits with large g-factor differences, *Phys. Rev. Lett.* **128**, 126803 (2022) doi: <https://arxiv.org/abs/2111.05130>
3. D. Jirovec, A. Hofmann, A. Ballabio, P. M. Mutter, G. Tavani, M. Botifoll, A. Crippa, J. Kukucka, O. Sagi, F. Martins, J. Saez-Mollejo, I. Prieto, M. Borovkov, J. Arbiol, D. Chrastina, G. Isella, and G. Katsaros, A singlet triplet hole spin qubit in planar Ge, *Nat. Mater.* **20**, 1106 (2021).
4. M. Valentini, F. Peñaranda, A. Hofmann, M. Brauns, R. Hauschild, P. Krogstrup, P. San-Jose, E. Prada, R. Aguado, and G. Katsaros, Non-topological zero bias peaks in full-shell nanowires induced by flux tunable Andreev states, *Science* **373**, 82 (2021).
5. L. Vukušić, J. Kukučka, H. Watzinger, J. Milem, F. Schäffler, and G. Katsaros, Single-shot readout of hole spins in Ge, *Nano Letters* **18**, 7141 (2018), doi: [10.1021/acs.nanolett.8b03217](https://doi.org/10.1021/acs.nanolett.8b03217)
6. H. Watzinger, J. Kukučka, L. Vukušić, F. Gao, T. Wang, F. Schäffler, J. J. Zhang, and G. Katsaros, A germanium hole spin qubit, *Nat. Commun.* **9**, 3902 (2018), doi: [10.1038/s41467-018-06418-4](https://doi.org/10.1038/s41467-018-06418-4)

7. N. Ares, V. N. Golovach, G. Katsaros, M. Stoffel, F. Fournel, L. I. Glazman, O. G. Schmidt, and S. De Franceschi, On the nature of electrically tunable hole g-factors in quantum dots, *Phys. Rev. Lett.* **110**, 046602 (2013), doi: 10.1103/PhysRevLett.110.046602
8. E. J. H. Lee, X. Jiang, R. Aguado, G. Katsaros, C. M. Lieber, and S. De Franceschi, Zero-bias anomaly in a nanowire quantum dot coupled to superconductors, *Phys. Rev. Lett.* **109**, 186802 (2012), doi: 10.1103/PhysRevLett.109.186802
9. G. Katsaros, V. N. Golovach, P. Spathis, N. Ares, F. Fournel, O. G. Schmidt, L. I. Glazman, and S. De Franceschi, Observation of spin selective tunnelling in SiGe nanocrystals, *Phys. Rev. Lett.* **107**, 246601 (2011), doi: 10.1103/PhysRevLett.107.246601
10. G. Katsaros, P. Spathis, M. Stoffel, F. Fournel, M. Mongillo, V. Bouchiat, F. Lefloch, A. Rastelli, O. G. Schmidt, and S. De Franceschi, Hybrid superconductor-semiconductor devices made from self-assembled SiGe nanocrystals on silicon, *Nat. Nanotech.* **5**, 458 (2010), doi: 10.1038/NNANO.2010.84

Most important other scientific/scholarly research achievements (selected)

1. **Awards - Calls for Professorships:** Elected member of the Young Academy of the Austrian Academy of Sciences (2015); W3 Professorship for Solid State Physics (Department Chair) at the Technical University of Dresden (2014) (declined)
2. **Research projects:** ERC Starting Grant (2013-18); FWF Start Programme 2013; 2 stand-alone FWF projects, 2 FWF/DACH projects, 2 FET-OPEN Projects, Marie Curie Career Integration Grant
3. **Institutional responsibilities:** Head of the Machine shop scientific service unit 2022/23
Head of the Nanofabrication scientific service unit 2017/18, 2018/19, 2019/20, 2020/21
Physics track representative 2016/17
Student Mentor 2019/20, 2020/21
Female faculty recruiting committee member 2018/19, 2019/20, 2020/21
4. **Reviewing activities:** Reviewer for the Natural Sciences and Engineering Research Council of Canada, European Research Council (remote reviewer Starting Grant); Reviewer for Journals: *Nat. Nanotech./Phys./Commun./Quantum Information/Reviews Physics, Phys. Rev. Lett., Phys. Rev. X, Nano Letters*
5. **Teaching:** The physics of quantum dots (since 2016)
6. **External PhD committees:**
30.06.2022 William Lawrie, *Spin qubits in Silicon and Germanium*, TU Delft
17.02.2022 John Michniewicz, *Expansibility Evaluation of a Twodimensional Access Array for Quantum Computing*, Univ. Cambridge
04.02.2022 Jovian Delaforce, *Quantum transport in novel superconducting hybrid junctions based on germanium nanowire heterostructures*, Univ. Grenoble Alpes
02.07.2020 Florian Froning, *Hole Spin Qubits in Ge/Si Core/Shell Nanowires*, University of Basel
10.12.2020 Anthony Amisse, *Couplage et dynamique de boites quantiques en technologie MOS silicium étudiés par réflectométrie radio-fréquence sur grille*, Université Grenoble Alpes
7. **Other membership in exam and thesis committees at IST Austria:**
 - **Chair for the Qualification Exams of:** 12.11.2021 Natalia Ruzickova (Tkacik Group) / 24.04.2021 Arka Pal (Barton Group) / 24.08.2020 Julia Lyudchik (Danzl Group) / 27.01.2020 Linda Sartoris (Cremer Group) / 12.02.2019 Michael Riedl (Hof Group) / 06.09.2018 Mike Hennessey-Wesen (Hof Group) / 05.02.2018 Pascal Wild (Wagner Group) / 07.02.2017 Serhii Avvakumov (Wagner Group).
 - **Committee member for the Qualification Exams of:** 11.04.2022 Shiva Safari (Modic Group) / 25.02.2021 Oliver Sagi (my group, as supervisor) / 26.11.2020 Denise Puglia (Higginbotham Group) / 22.04.2020 Riya Sett (Fink Group) / 06.02.2020 Mariano Calcabrini (Ibañez

Group) 28.03.2019 Farid Hassani (Fink Group) / 28.01.2019 Marian Janik (my group, as supervisor) / 06.12.2018 Daniel Jirovec (my group, as supervisor) / 04.10.2018 Georg Arnold (Fink Group) / 02.02.2017 Matilda Peruzzo (Fink Group).

- **Chair for the Thesis Defense of:** 28.08.2020 Isabella Tomanek (Guet Group) / 08.06.2020 Serhii Avvakumov (Wagner Group) / 31.01.2019 Dominik Forkert (Maas Group).
- **Graduates under my supervision:** 30.08.2021 Daniel Jirovec / 10.06.2020 Josip Kukučka / 24.08.2018 Lada Vukusić / 06.07.2018 Hannes Watzinger

8. Organization of scientific meetings:

- Organizer of the Hybrid Quantum Technologies workshop & Germanium Day 2023, IST Austria (<https://hqt2023.pages.ist.ac.at/>)
- Program committee member for the 21th International Winterschool on New Developments in Solid State Physics, Mauterndorf 2018, 2020 and 2023

9. Invited presentations at international conferences/schools :

- 21.09.2021, Silicon Quantum Information Processing Workshop (invited talk)
Hole spin orbit physics and qubits in planar Ge devices
- 30.08.-03.09.2021, SemiconNano2021 (plenary talk)
Ge hole spin qubits
- 12.04.2021, Virtual conference on "Searching for Topological Majorana Zero Modes" (invited talk) **InAs/Al full-shell nanowires and proximitized Ge hole gases: Suitable platforms for the realization of Majorana zero modes?**
- 15.-19.03.2021, Virtual APS March Meeting (invited talk)
Flux-tunable Andreev bound states in hybrid full-shell nanowires
- 31.08-04.09.2020, Virtual CMD2020GEFES (invited talk)
Flux-tunable Andreev bound states in hybrid full-shell nanowires
- 02.-06.06.2019, 2nd Joint ISTDM/ICSI 2019 Conference (invited talk), Wisconsin-Madison, US
Hole Spins and Qubits in Germanium Hut Wires
- 16.-23.03.2019, Quantum Mesoscopic Physics (invited talk), La Tuille, FR
A heavy hole Ge spin qubit
- 04.-08.03.2019, APS March Meeting (invited talk), Boston, USA
A Ge heavy hole spin qubit
- 10.-14.09.2018, Spin Qubits IV (invited talk), Konstanz, DE
Hole spin qubits in Ge self-assembled hut wires
- 16.-19.07.2018, Quantum designer Physics (invited talk), San Sebastian, ES
Ge hole spin qubit
- 18.-21.09.2017, European Materials Research Society Meeting (invited talk), Warsaw, PL
Heavy hole states in Germanium hut wires
- 03.10.2016, Workshop of the Nanoscale Science Department of the MPI Stuttgart at Schloss Rinberg (invited talk), DE
Silicon is great! What about Germanium?
- 14.-15.05.2015, Spin and Topological phenomena in nanostructures (invited talk), Salerno, IT
Low temperature magnetotransport through Ge hut wires
- 02.-06.10.2011, Workshop on Quantum spintronics II (invited talk), Sardinia, IT
Spin orbit effects in SiGe self-assembled quantum dots
- 11.-16.09.2011, SemiconNano2011 (invited talk), Traunkirchen, AT
Low temperature electronic transport through SiGe self-assembled quantum dots
- 13.-19.06.2011, Nanowires 2011 (invited talk), Lesbos, GR
Fabrication and low temperature transport of Si based nanodevices

- 20.-23.09.2010, GDR Mesoscopic Physics Conference (invited talk), Aussois, FR
Self-assembled SiGe single-hole transistors
- 17.-22.09.2006, Epitaxial Growth and Fundamental Properties of Semiconductor Nanostructures (invited talk), Bonassola, IT
Revealing the 3D shape and compositional profiles of buried SiGe/Si(001) islands

10. Invited seminars:

- 28.04.2022, University of Southern Denmark, SDU, DK (MCI seminar - online)
Hybrid semiconductor-superconductor devices
- 24.01.2022, Vienna Center for Quantum Science and Technology (VCQ) (invited colloquium talk)
Semiconductor nanodevices: From basic physics to quantum information
- 14.12.2020, Politecnico of Milano, IT
Germanium: a promising material platform for the realization of long lived, electrically tunable hole spin qubits (online presentation)
- 17.10.2019, Physics colloquium, Basel University, CH
Understanding holes: the journey continues
- 11.10.2019, ETH Zürich, CH
Spin orbit physics in Ge hut wires
- 02.09.2019, Karlsruhe Institute of Technology, DE
Self-organized Ge hut wires for quantum transport experiments
- 25.06.2019, Physics colloquium, University of Konstanz, DE
Playing with holes
- 08.04.2019, CEA Saclay Paris, FR
Making qubits out of Ge hut wires
- 10.12.2018, Johannes Kepler University Linz, AT
Towards scalable hole spin qubits in Ge hut wires
- 20.10.2017, University of Konstanz, DE
Holes are heavy, are they good?
- 10.04.2017, Niels Bohr Institute, DK
Holes: A blessing or a curse?
- 16.02.2017, Seminar in the colloquia series of the Department of Materials at the University of Oxford, UK
What are holes good for?
- 08.08.2016, University of Science and Technology Hefei, Key laboratory for Quantum information, CN
SiGe self-assembled nanostructures: a promising platform for spin qubits?
- 16.04.2016, Doktoratskolleg Solids4fun TU Vienna, AT
SiGe self-assembled nanostructures: a promising host for spin qubits?
- 29.05.2012., 1. Physikalisches Institut, University of Stuttgart, Stuttgart, DE
Hole spin physics in SiGe self-assembled nanostructures
- 10.02.2012, Condensed Matter Theory and Quantum Computing department, University of Basel, CH
SiGe self-assembled quantum dots: from surface science to quantum transport
- 15.12.2011, Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Dresden, DE
Spin orbit effects in SiGe self-assembled quantum dots
- 12.10.2011, Max Planck Institute of Microstructure Physics, Halle, Department II, DE
Self-assembled SiGe single hole transistors
- 08.06.2011, Forth-Krete, GR
Self-assembled SiGe single hole transistors

- 26.01.2011., Quantum Transport group, TU Delft, NL
Self-assembled SiGe single hole transistors
- 11.03.2010., Niels Bohr Institute, DK
Quantum transport through SiGe self-assembled quantum dots