

Ing. Filip KŘÍŽEK, PhD.

Personal data

PLACE AND DATE OF BIRTH: Czech republic | 19th May 1989
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Work experience

- 2018 - | Postdoctoral researcher, DEPARTMENT OF SPINTRONICS AND NANOELECTRONICS, INSTITUTE OF PHYSICS ASCR, v. v. i., Czech Republic
Molecular beam epitaxy of Magnetic materials, XRD, STEM/TEM DPC, Electron Beam Litography, thin film deposition, SEM, AFM, electronic transport characterization, low temperature measurements.
- 2021 - 2022 | Postdoctoral researcher and IBM QUANTUM ACADEMIC NETWORK FELLOW AT THE DEPARTMENT OF PHYSICS, ETH ZURICH, Switzerland
Molecular beam epitaxy of III-V 2DEG semiconductor/superconductor hybrid materials, STEM, thin superconducting film deposition, 2DEG physics, AFM, electronic transport characterization, low temperature measurements.
- 2015 - 2018 | PhD. candidate, CENTER FOR QUANTUM DEVICES, MICROSOFT STATION Q, NIELS BOHR INSTITUTE, UNIVERSITY OF COPENHAGEN, Denmark
Molecular beam epitaxy, Electron Beam Litography, Thin Film Deposition, SEM, AFM, TEM, electronic transport characterization, low temperature measurements.
- 2014 - 2015 | Research assistant, INSTITUTE OF PHYSICS ASCR, v. v. i., Czech Republic
SEM and AFM characterization, thin film deposition, Raman spectroscopy, preparation of silicon and metallic nanostructures (nanowires), PECVD.
- 2008 - 2010 | Assistant to sponsoring manager, GUARANT INTERNATIONAL, S.R.O., Czech Republic
Fundraising for congresses and conferences, communication with clients, technical support during congresses, casual administrative work.
- 2005 - 2007 | Administrative worker, SALZGITTER MANNESMANN STAHLHANDEL S.R.O., Czech republic
Casual administrative work.

Education

- 2015 - 2018 | PhD. in CONDENSED MATTER PHYSICS, **University of Copenhagen - Niels Bohr Institute**, Denmark
Doctoral Thesis: Semiconductor Nanowire Networks Grown by Molecular Beam Epitaxy
Supervisor: Peter KROGSTRUP, Charles M. MARCUS.
- 2013 - 2015 | Master of science in OPTICS AND NANOSTRUCTURES, **Czech Technical University - FNSPE**, Czech Republic
Thesis: Analysis of growth and properties of silicon nanowires
Research project: Plasmonics: basic LSPR modeling, model and quantum application overview
Supervisor: RNDr. Antonín FEJFAR, CSc.
- 2010 - 2013 | Bachelor of science in PHYSICAL ENGINEERING, **Czech Technical University - FNSPE**, Czech Republic
Bachelor's thesis: Resonant effects in plasmonic nanostructures for sensing applications
Supervisor: Doc. Ing. Ivan RICHTER, Dr.
- 2008 - 2010 | Studies in ECONOMICS, **Czech University of Economics**, Czech Republic
- 2005 - 2008 | Graduated from **Czechoslovak Business Academy of Dr. Edvard Benes**

Selected publications

- 2022 | SCIENCE ADVANCES, 8 (13)
Title: Atomically sharp domain walls in an antiferromagnet
- 2022 | NATURE COMMUNICATIONS, 13 - 724
Title: Defect-driven antiferromagnetic domain walls in CuMnAs films
- 2020 | NATURE ELECTRONICS, 2020, 4 (1), PP 30-37
Title: Quenching of an antiferromagnet into high resistivity states using electrical or ultrashort optical pulses
- 2020 | ADVANCED MATERIALS, 32 (23) 2020, PP 1908411
Title: Shadow lithography for in-situ growth of generic semiconductor/superconductor devices
- 2020 | PHYSICAL REVIEW MATERIALS, 2020, 4 (1), PP 014409
Title: Molecular beam epitaxy of CuMnAs
- 2018 | PHYSICAL REVIEW LETTERS, 2018, 121 (14), PP 147701
Title: Selective-area-grown semiconductor-superconductor hybrids: A basis for topological networks

- 2018 | PHYSICAL REVIEW MATERIALS, 2018, 2 (9), PP 093401
Title: Field effect enhancement in buffered quantum nanowire networks
- 2018 | NANO LETTERS, 2018, 19 (1), PP 218-227
Title: Selectivity Map for Molecular Beam Epitaxy of Advanced III-V Quantum Nanowire Networks
- 2017 | NANO LETTERS, 2017, 17 (10), PP 6090-6096
Title: Growth of InAs Wurtzite Nanocrosses from Hexagonal and Cubic Basis

Teaching experience

- Teaching assistant: | SEMICONDUCTOR MATERIALS: FUNDAMENTALS AND FABRICATION, BACHELOR/MASTER/PHD. LEVEL, **ETH Zurich**, Switzerland
- Teaching assistant: | NANO 3 - BASICS OF QUANTUM TRANSPORT, BACHELOR LEVEL, **University of Copenhagen - Niels Bohr Institute**, Denmark
- Teaching assistant: | PHYSICS LABORATORY, BACHELOR LEVEL, **Czech Technical University - FNSPE**, Czech Republic

Expertise and Skills

- Professional Expertise: | CONDENSED MATTER PHYSICS, MATERIALS SCIENCE, CRYSTAL GROWTH, NANOSCIENCE AND NANOTECHNOLOGY, SEMICONDUCTOR PHYSICS, SEMICONDUCTOR NANOWIRES AND RELATED DEVICES, MAGNETIC MATERIALS
- Software skills: | PYTHON, COMSOL MULTIPHYSICS, LATEX, VESTA, CAD designing, IMAGE J, ADOBE ILLUSTRATOR, ADOBE PHOTOSHOP, BEAMER, ...
- Teaching experience: | QUANTUM TRANSPORT LABWORKS TEACHING ASSISTENT - UNIVERSITY OF COPENHAGEN 2015-2018, BASIC LABROWKS TEACHING ASSITANT - CZECH TECHNICAL UNIVERSITY (2014)
- Experimental experiences: | MBE, EBL, SEM, STEM, PECVD, thin film deposition (e-gun, thermal, sputtering, ALD), cleanroom work and transport device fabrication, XRD, Raman spectroscopy, AFM, TEM, electronic device preparation, electronic characterization, low temperature measurements, ...

Languages

CZECH: native
ENGLISH: fluent
SLOVAK: fluent
FRENCH: fundamentals