Andrzej Piotr Kądzielawa PhD

Curriculum Vitae

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Experience

2018 – **Researcher**, *VŠB - Technical University of Ostrava*, Ostrava, Czechia.
IT4Innovations National Supercomputing Center

2017 – **Research and teaching assistant**, *Jagiellonian University*, Kraków, Poland.
Marian Smoluchowski Institute of Physics

2015 – 2017 **Research assistant**, *Jagiellonian University*, Kraków, Poland.
Marian Smoluchowski Institute of Physics

Education

2011 – 2015 **PhD**, *Jagiellonian University*, Kraków, Poland.
First-Principle Approach to Electronic States and Metal - Insulator Transition in Selected Correlated Model Systems
Supervision: Prof. Józef Spałek and Dr. Andrzej Biborski

2006 – 2011 **MSc**, *Jagiellonian University*, Kraków, Poland.
Evolution of a massless test scalar field on Boson Star space-time
Supervision: Dr. Andrzej Rostworowski

2010 **ERASMUS student exchange**, *Niels Bohr Institute*, Copenhagen, Denmark.
Graduate courses in Quantum Field Theory and Quantum Optics

Research and Scientific Activities

Conferences, Schools and Seminars

2013 – **8 oral presentations**.
6 in English; 2 in Polish; StoCP (2014, 2016, 2018), CCDS (2016, 2018), KKN (2013, 2015, 2017)

2013 – **5 seminars**.
1 in English; 4 in Polish; including Seminar of Polish Physical Society, Forschungszentrum Jülich, University of Silesia

2012 – **10 poster presentations**.
including: MMC (2012), ICM (2015), SCES (2016, 2017)

Publications

2013 – **8 papers**, *in peer-reviewed journals*.
Phys. Rev. B, Scientific Reports, Comput. Phys. Commun., New J. Phys., Acta Phys. Pol. A, Eur. Phys. J. B

Topics include: **Condensed Matter Physics, Computational Methods** — *ab-initio calculations, metallization hydrogen, high-performance computing, multilevel parallelism*

Miscellaneous

2015 – **Project MAESTRO**, *researcher*, National Science Centre (NCN), PI: Prof. Józef Spałek.
Fundamental Properties of Strongly Correlated Systems: Unconventional Superconductivity, Quantum Critical Behavior, and Complex Electronic Structure

2012 – 2015 **Project TEAM**, *doctoral scholarship*, Foundation for Polish Science (FNP), PI: Prof. Józef Spałek.
Correlations and coherence in quantum materials and structures (CCQM) - unique properties on macro and nano scales

Skills

Programming

C++ `c++11, c++17` — *original library (with with Dr. A. Biborski) Quantum Metallization Tools; usage of GSL, LAPACK (inc. CBLAS), openMP, MPI, llvm in: (generalized) eigenproblem, (Quantum) Monte Carlo, Simulated Annealing, (multidimensional) (non-)deterministic optimization procedures, (non-)deterministic integration (cf. `bitbucket.org/azja/qmt` and `github.com/Mellechowicz`)*

Python `python2.7` — *`numpy` and `scipy` for complex, deterministic and stochastic methods (Gutzwiller Ansatz, Monte-Carlo integration, Quantum-Chemical basis construction, phase identification), `tensorflow` for simple ML input automization*

other **Fortran 2008, Bash, Go, Wolfram Mathematica, Godot 3.0** — *for either abandoned projects, data analysis, teaching or computational cluster administration*

Teaching

2017 – **research and teaching assistant**, *Faculty of Physics*, Jagiellonian University, Kraków.
3D Geometry for Video Games Programming, Basics of Computer Programming: C with Elements of C++, Advanced Object Programming Techniques in C++, Robotics Laboratory, and Programming of Real-Time Physics

2013 – **teaching assistant**, *civil contract*, Jagiellonian University, Kraków.
Programming of Real-Time Physics for game developers

2011 – 2015 **doctoral student / teaching assistant**, *Faculty of Physics*, Jagiellonian University, Kraków.
Courses included: Physics 101, Physics Laboratory, and Programming of Real-Time Physics

Scientific knowledge

Physics
- Classical Physics (i.e., Newtonian, Lagrangian, and Hamiltonian Mechanics, Electromagnetism, Optics, Statistical Physics with Thermodynamics, as well as both Special and General Relativity)
- Quantum Physics (with emphasis on condensed-matter applications, e.g., the many-body problem, Quantum Statistics, (Super)conductivity, Crystalline Structure)

Mathematics
- Linear algebra (e.g., Vector and Tensor Spaces)
- Group Theory (e.g., Spacial Symmetry Groups)

Miscellaneous

2012 – **HPC**, *calculations on several small-to-large computational clusters*.
`shiva`, `deszno`, `edabi` (Jagiellonian University); `tera` (Academic Centre for Materials and Nanotechnology, AGH); `anselm`, `salomon` (IT4Innovations, VŠB)

2016 – **administration of Computational Cluster `EDABI`**, *Jagiellonian University*, Kraków, Poland.
coordination of the acquisition in 2016; administration since the activation in late 2016; coordination of the augmentation in early 2018; performance of ~ 12 `TFLOPS DP`

typesetting **LaTeX, office-suite-type software** — *inc. word processor, spreadsheet, presentation program, database software (e.g., LibreOffice), and graphics editors (e.g., GIMP, InkScape)*

Languages

CEFR levels

Polish (native) — **English** (C2)
Spanish (B1) — **German** (A2)
Russian (A2 - alphabet, lexically similar) — **Danish** (A1)

Interests

professional
- electronic correlations
- computational physics
- stochastic algorithms
- machine learning

other
- traveling and hiking
- tea
- scuba-diving
- gaming

Licenses

driving licence **A, B** — *motorcycles and cars*
diving licence **Advanced Open Water Diver, Ice Diver** — *PADI*
licence **counsellor** — *day care*