Aleksandr Kadykov cv@kadykov.com

Research Engineer

Proven ability to design and execute experiments, analyse and present data, develop scientific Python software. Strong background in applied and basic research in THz photonics and solid-state physics.

- Data analysis & presentation
- Experimental design & execution
- Instrumentation integration & orchestration
- Scientific Python development

Multitel ASBL

Mons
Belgium

Non-profit innovation center specializing in applied photonics, AI, etc.

Research Engineer in THz Spectroscopy and Imaging

Jul. 2021
Aug. 2024

- Developed a THz time-domain spectroscopy (THz-TDS) data pipeline with an improved signal-to-noise ratio by utilizing sensitivity profile-shaped filtering.
- Developed a computationally cheap THz-TDS data processing method for refractive index and thickness extraction in low-absorption materials.
- Streamlined refractive index profile reconstruction from THz-TDS data by offloading calculations to a GPU and utilizing backpropagation-based optimization algorithms.
- Implemented a low-cost operation and high spectral quality broadband THz-TDS setup by suppressing atmospheric absorption with silica gel-based dehumidification.
- Automated laboratory workflows by implementing Python tools for measurement orchestration, data management, analysis, and result presentation.
- Ensured best software development practices by implementing unit testing, CI/CD pipelines, and documentation.
- Led the SAPHIRE project, developing non-destructive *in-situ* solutions to control pill coating thickness and humidity.
- Led the development of THz-TDS-based methods for polymer wastes sorting.

Laboratoire National de Métrologie et d'Essais (LNE)

Trappes
France

French National Laboratory of Metrology and Testing

Aleksandr Kadykov cv@kadykov.com

Research Engineer in Quantum Hall Effect Metrology

Sep. 2018
Sep. 2020

- Led low-noise cryogenic quantum Hall measurements on graphene, exploring its potential as a resistance standard.
- Designed a flexible Python software package using PyMeasure, optimizing scientific equipment orchestration.
- Participated in the nanofabrication of hBN-encapsulated graphene samples, advancing quantum Hall research.
- Improved performance of a helium gas recuperation system.

Institute for Physics of Microstructures (IPM RAS)

Nizhny Novgorod
Russia

State-owned research institute specializing in solid state physics.

Research Engineer in Photonics of Narrow-Gap Semiconductors

May 2017
Sep. 2018

- Conducted THz and FTIR cryogenic measurements of photoluminescence and photoconductivity.
- Achieved laser emission in HgCdTe heterostructures at a record wavelength.

Laboratoire Charles Coulomb (L2C) & IPM RAS

Montpellier, France
Nizhny Novgorod, Russia

I2S Doctorlal School at the University of Montpellier

Ph.D. in Physics

Sep. 2014
Dec. 2017

Thesis: Physical properties of HgCdTe-based heterostructures: towards terahertz emission and detection

- Implemented a double-modulation technique, enabling the extraction of critical magnetic fields in a topological insulator.
- First to observe a temperature-driven phase transition in a topological insulator using magnetotransport.

Technical skills

- **Programming & data analysis**: Python, Jupyter, NumPy, Pandas, Xarray, SciPy, PyTest, PyTorch, scikit-learn, MATLAB
- **Data visualization**: Matplotlib, hvPlot, Plotly, Bokeh, Panel, OriginPro
- **Measurement & automation**: PyMeasure, Bluesky, yaq, LabVIEW
- **Data management & integration**: Intake, SQL
- **Document preparation**: Quarto, Typst, Pandoc, LaTeX
- **Other tools**: VSCode, Git, Linux, Docker, CI/CD, Zotero, GitHub, GitLab, TDD

Languages

- **French** (upper-intermediate)

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- **Russian** (native)