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Letter to Future Employer

Dear Future Employer,

In this open letter, I would like to give you a bird's-eye view of my career path.

Photonics & Magnetotransport in L2C & IPM RAS

I am a Research Engineer, and I started my journey in basic research. My Ph.D., a collaboration between Laboratoire Charles Coulomb (L2C) and Institute for Physics of Microstructures (IPM RAS), focused on photonics and magnetotransport in HgTe/HgCdTe quantum wells.

At IPM RAS, I studied photoconductivity and photoluminescence in these heterostructures to use them as detectors and emitters in the far-infrared range. At L2C, the main focus was on the topological insulator state in these heterostructures and how to explore topological phase transitions by THz detection or magnetotransport measurements.

As a result, the topological phase transition in these heterostructures was first observed by magnetotransport, and laser emission at a record-breaking wavelength was obtained. The most impressive results were published in high-impact journals like Nature Communications, PRL, PRB, APL, etc.

High-Precision Measurements in LNE

After finishing my Ph.D., I moved to applied research and worked for two years in the French National Laboratory of Metrology and Testing (LNE) as a Research Engineer. There, I continued to explore magnetotransport properties of 2D systems and gained hands-on experience by conducting state-of-the-art low-noise and high-precision metrological measurements of the quantum Hall effect in graphene.

One of my main contributions was the automation of measurements by implementing an orchestration software based on PyMeasure in Python. I also worked to decrease the costs of cryogenic measurements by optimizing the helium recuperation system and improving the reliability of a dry helium-free cryogenic system.

THz Innovations in Multitel

Then, I continued my career in applied research and worked for more than three years as a Research Engineer in Multitel ASBL, a non-profit innovation center. There, I led THz time-domain spectroscopy (THz-TDS) and imaging activities, developing THz-based solutions for industrial applications like non-destructive quality control of humidity, thickness, or composition in pharmaceutical, polymer, or biological samples.

As a result, I developed new and improved existing ways to extract information from THz-TDS data, such as computationally cheap preliminary estimation of thickness and refractive index in low-absorption samples or sensitivity curve-shaped filtering with enhanced signal-to-noise ratio.

I also implemented infrastructure for reliable research, including Python tools for instrument integration and measurement orchestration, a FAIR (findable, accessible, interoperable, and reusable) data management system, and a reproducible data analysis and reporting system.

As programming has always been a big part of my job, I gained experience in test-driven development, documentation writing, automation with CI/CD pipelines, and containerization with Docker.

What's Next?

Now, I'm looking forward to new opportunities to use my skills and experience as a Research Engineer to advance the world for a better future. Maybe in your team?

Thank you for your attention.

Best regards,
Aleksandr KADYKOV