CeNT-62-2023

Director of Centre of New Technologies of the University of Warsaw, with the Project Leader, announce opening of the competition for student positions in the Quantum Optical Devices Lab – Centre of New Technologies of the University of Warsaw.

SCHOLARSHIP OFFER

Position in the project:	Student
Scientific discipline:	Physical sciences
Job type (employment contract/stipend):	Scholarship
Max number of job offers:	6
Remuneration/stipend amount/month *("X0 000 PLN of full remuneration cost, i.e. expected net salary at X 000 PLN"):*	1000 - 2500 PLN gross/month depending on level of involvement
Position starts on:	01.02.2024
Maximum period of contract/stipend agreement:	31.05.2025
Institution:	Centre of New Technologies, University of Warsaw
Project leader:	Michał Parniak-Niedojadło
Project title:	Bridging microwave and optical domains with nonlinear quantum optics enabled by Rydberg atoms
Project description:	Microwave (10-100 GHz) and optical (300 THz) domains are vastly different, yet both find applications in quantum technologies. Optical photons are great for communication, as they are able to travel far and preserve quantum information. On the other hand, microwave photons have emerged as important particles in quantum computing, being present in for instance transmon qubits. Bridging the gap between those two domains, in order to harness the advantages of both, has recently become an important challenge undertaken by many groups. Example platforms employed to solve this problem include optomechanical systems, electro-optic systems and cavity-QED systems. **In this project, we propose to employ Rydberg atoms, which couple efficiently to photons from both domains.** **Group website:** https://www.qodl.eu/ **Project website:** https://www.qodl.eu/sonata-bridging/
Key responsibilities include:	Responsibilities will be selected from the list below based on candidate's qualifications. 1. Experimental implementation in the lab 2. planning & building optical setups 3. aligning beams, calibration, and optimization

	4. taking measurements 5. data analysis 6. designing new experiments 7. theoretical analysis and consultation with theory collaborators 8. writing acquisition, and analysis software 9. presentation of results at conferences 10. participation in writing publications 11. theoretical calculations and simulations and participation in experiments: simulating the propagation of light under EIT conditions 12. simulating multilevel atomic structures 13. verification of theoretical models using experimental data analysis 14. estimation of fundamental bounds on sensitivity and efficiency of experimental methods
Profile of candidates/requirements:	Depending on targeted tasks, we require skills in working with optical and electronic equipment, or theory skills in atomic and optical simulations. Experience in at least one of the fields: optical physics/photonics, electronics, python or other scripting language, labview, mathematica, commensurate with the education level of the candidate. University of Warsaw strongly values the diversity of candidates and is very committed to the equality of opportunity.
Required documents:	1. Curriculum vitae with research records 2. Academic transcript 3. Contact details of at least one senior researcher familiar with candidate's work 4. Consent clause for processing personal data in the application process, signed and scanned, or electronically signed, that can be downloaded from http://qot.cent.uw.edu.pl/positions/. 5. Optionally: report or other documentation conerning electronics or programming or optical projects or other physics completed so far. 6. Fill in the form at https://forms.gle/cm7tJASPpnmPVmBH6
We offer:	Participation in an exciting research program conducted within a newly established centre with high scientific expectations and goals. An open and friendly research environment with access to all the facilities available within the Centre of New Technologies (CENT)—an interdisciplinary research institute established within the University of Warsaw to gather international researchers of different backgrounds and experience, in order to conduct state-of-the-art research in biological, chemical and physical science: http://cent.uw.edu.pl/en/.
Please submit the following documents to:	Please send the application via email to m.parniak@cent.uw.edu.pl with "[SONATA students]" in the title.
Application deadline:	8 January 2024
Results of the competition will be announced not later than:	31 January 2024
Results will be announced on:	CeNT website: https://cent.uw.edu.pl/en/career/
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