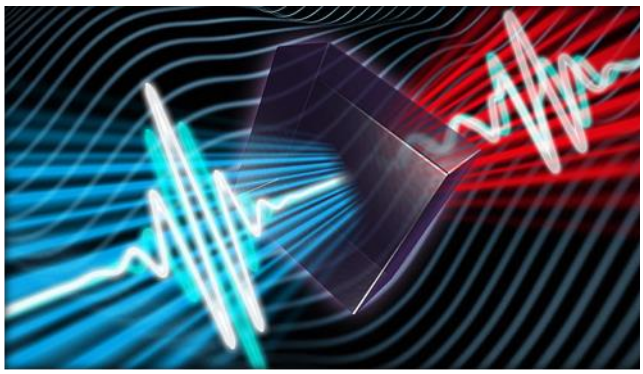
JOB OFFER – PhD student

From academic year 2023/2024 (start: 01.10.2023)



Position type:	PhD student
Number of positions	1
Scientific discipline:	Automatics, Electronics, Electrical engineering and Space Technologies
Type of renumeration:	Scholarship + employment
Renumeration:	~6000 PLN net / month (1st and 2nd PhD year) ~7500 PLN net / month (years 3-5)
Position starts on:	1st October 2023
Period of contract:	1.10.2023 – 31.03.2028
Institution:	Wrocław University of Science and Technology; Faculty of Electronics, Photonics and Microsystems (W12); Department of Field Theory, Electronic Circuits and Optoelectronics (K35) Laser & Fiber Electronics Group
Principle investigator	Dr hab. inż. Jarosław Sotor, assoc. professor Dr Maciej Kowalczyk
Title of the project:	Ultrastable single-cycle mid-infrared laser sources
Description of the project:	The project covers the fields of photonics and electronics: in particular, it focuses on lasers generating ultrashort pulses and their stabilization. Within the project, we will develop state-of-the-art stabilized laser sources that generate powerful ultrashort pulses in the mid-infrared spectral range between 2 and 20 μm. These sources will be based on chromium solid-state (Cr:ZnS) lasers, and the duration of the generated pulses will reach single electric field oscillation (sub-10 fs). These pulses will then be converted to the mid-infrared range using nonlinear optics techniques [Nature Photonics 16, 512 (2022)]. The laser sources we are developing have direct applications in biomedicine. Our research is conducted in close cooperation with renowned foreign partners: Ludwig Maximilians University in Munich and the Max Planck Institute for Quantum Optics. The partners will use the results of our studies in spectroscopic measurements of human blood for early detection of cancer [Nature 577, 52 (2020)]. The goal of the project is to develop novel stabilization techniques for the developed cutting-edge Cr:ZnS lasers and improve their performance beyond the current state of the art. The planned result of the project will be the world's most stable single-cycle frequency comb in the mid-infrared spectral range, which will be subsequently applied for cancer diagnosis.

	During the course of the PhD, the candidate will carry out several foreign research internships at the German partners' facilities. The project is funded by the National Agency for Research Exchange (NAWA) under the Polish Returns program.
Main tasks:	1. Development of femtosecond solid-state lasers based on Cr:ZnS gain crystals (laser physics) 2. Spectral broadening and temporal compression of laser pulses to single electric field oscillation (nonlinear optics) 3. Spectral conversion of the laser pulses to the mid-infrared range (nonlinear optics) 4. Active stabilization of the Cr:ZnS laser to a frequency comb (electronics)
Profile of candidates (requirements):	1. Physics and electronics graduates preferred 2. Accomplishment of undergraduate studies (at Master level) 3. Knowledge in optics and laser physics. Practical hands-on experience with lasers and optics (setting-up optical experiments) is beneficial 4. Required English language skills at minimum B2 level 5. Enthusiasm, strong motivation for experimental research and patience. 6. Availability (full-time contract) and mobility
Required documents	1. Curriculum vitae (CV) including major achievements and scientific publications, awards, scientific activity. 2. Motivation letter Please highlight your competencies in terms of the tasks performed in the project.
We offer:	• A stable and attractive stipend over the entire PhD period, • Participation in a very attractive scientific program focused on fundamental research, • Work in a recognized team of researchers, • Possibility for short-term research stays at Max Planck Institute of Quantum Optics • Access to unique top-level equipment, • Dissemination of your results in scientific journals • Great opportunities to accomplish a very interesting PhD course • Participation in scholarships, schools, research visits, etc.
Recruitment procedure:	All proposals will be evaluated by the recruitment committee, consisting of the scientific advisor and two members (experts in the field of fiber optics), taking into account: a) Competences of the candidates, i.e., experience in similar projects, knowledge in fiber optics and laser technology b) research achievements of the candidates (grades obtained during studies, publications, research activities) c) Awards and prizes obtained by the candidates In the second round of recruitment, selected candidates will be invited to an interview with the recruitment committee. Candidates will be informed via e-mail about the results of the competition.
E-mail for sending applications and inquiries:	maciej.kowalczyk@pwr.edu.pl
Application deadline:	**Please send your application until 5th June 2023.** **Please note that recruitment for doctoral studies lasts only until 12th June 2023!**

Please include in your application:

"I hereby give consent for my personal data included in my application to be processed for the purposes of the recruitment process under the Personal Data Protection Act as of 29 August 1997, consolidated text: Journal of Laws 2016, item 922 as amended."