1 PhD position in an Innovative Training Network (Marie Skłodowska-Curie MSCA-ITN) in Terahertz Photonics (TERAOPTICS Project 956857)

* **ORGANISATION/COMPANY**

Center for Physical Sciences and Technology (FTMC)

* **RESEARCH FIELD**

Physics › Solid state physics

Physics › Opto-electronics

Engineering › Material engineering

* **RESEARCHER PROFILE**

First Stage Researcher (R1)

* **APPLICATION DEADLINE**

30/10/2020 16:00 - Europe/Vilnius

* **LOCATION**

FTMC, Sauletekio al. 3, LT-10257 Vilnius, Lithuania

* **TYPE OF CONTRACT**

Temporary

* **JOB STATUS**

Full-time

* **HOURS PER WEEK**

40

* **EU RESEARCH FRAMEWORK PROGRAMME**

H2020 / Marie Skłodowska-Curie Actions

* **MARIE CURIE GRANT AGREEMENT NUMBER**

956857

Applications are invited for a PhD position (Early Stage Researcher) to be funded by the European Commission’s Horizon 2020 Marie Skłodowska-Curie Innovative Training Network (ITN) “TERAOPTICS – Terahertz Photonics for Communications, Space, Security, Radio-Astronomy, and Material Science”. TERAOPTICS is a consortium of high-profile universities, research institutions and companies located in France, Germany, Lithuania, Spain, and the United Kingdom. Full list of the available 15 ESR positions can be found on <https://euraxess.ec.europa.eu/jobs/547266>.

**1 ESR position available at FTMC, Lithuania.**

Title: Diffractive optics integration with THz detectors and emitters // Tyrimas difrakcinės optikos integruotos su THz detektoriais bei šaltiniais

Objectives: The goal of this PhD project is to research and develop high efficiency diffractive lenses in order to replace refractive optics used with THz detectors and emitters. The silicon-based multi-level phase-correcting Fresnel lenses including antireflective structures as well as the free-standing-film Soret zone plate lenses will be investigated in the frequency range of 0.3-4.7 THz.

Tasks: You will investigate the diffractive optics together with lenses, filters, anti-reflective and phase array structures for novel THz detectors and THz sources. You will use unique spectroscopic THz imaging and microscopy tools that our department has recently developed. You will work with cutting-edge THz detectors and emitters with laser-processed diffractive optics and join a young and innovative team of experienced researchers and technicians.

L. Minkevičius, et al., Optics Letters 42(10), pp. 1875-1878 (2017). <https://doi.org/10.1364/OL.42.001875>

S. Indrišiūnas, et al., Optics Letters 44 (5), pp. 1210-1213 (2019). <https://doi.org/10.1364/OL.44.001210>

S. Indrišiūnas, et al., IEEE Transactions on Terahertz Science and Technology 9 (6), pp. 581-586 (2019). <https://doi.org/10.1109/TTHZ.2019.2939554>

V. Janonis et al., Applied Physics Letters 116 (11), art. no. 112103 (2020). <https://doi.org/10.1063/1.5143220>

#### [**ADDITIONAL INFORMATION**](https://euraxess.ec.europa.eu/jobs/547266#bootstrap-fieldgroup-accordion-item--additional-information-0)

#### **Benefits**

Benefits and Salary

The MSCA programme offers highly competitive and attractive salary and working conditions. The successful candidates will receive a salary in accordance with the MSCA regulations for Early Stage Researchers. Exact salary will be confirmed upon appointment [Living Allowance = 2370.75 euro/month + Mobility allowance = 600 to 1100 euro/month depending on the family situation]. In addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes secondments, a variety of training modules as well as transferable skills courses and active participation in workshops and conferences. The approximate gross salary stated above is subject to employer's statutory deductions and the amount varies according to the living costs of the host country.

#### **Eligibility criteria**

Early Stage Researcher (ESRs): All researchers recruited must be Early Stage Researchers. ESRs are those who, at the time of recruitment by the host are in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. This is measured from the date when they obtain the degree which formally entitles them to embark on a doctorate (either in the country in which the degree was obtained or in the country in which the researcher is recruited, even if a doctorate was never started or envisaged).

Conditions of Mobility of Researchers: Researchers are required to undertake physical, transnational mobility (i.e., move from one country to another) when taking up their appointment. Researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years prior to their recruitment. Short stays, such as holidays, are not taken into account. Note that the mobility rule applies to the (first) beneficiary where the researcher is recruited, and not to beneficiaries to which the researcher is sent or seconded.

English Language: ESRs must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficient for them to derive the full benefits of the network training.

#### **Selection process**

To apply, please make an initial informal contact with the primary supervisor with a copy of your CV and motivation letter describing your research interests and career ambitions. Following subsequent screening, potential candidates will be advised to make a formal application for the ESR position, and if successful, also to PhD study at the FTMC, Lithuania. Full list of documents for admission to doctoral studies: <https://www.ftmc.lt/admission-to-doctoral-studies-in-2020>

The selection process will include a formal interview with the short-listed candidates. The recruitment process will continue until a suitable candidate has been identified and accepted the PhD position offer.

We support equal opportunity and we are committed to achieving diversity within the workforce and creating an inclusive working environment.

Applications from women and those from an ethnic minority are encouraged.

#### **Additional comments**

Number of available positions: 1 PhD position.

**Scientific Supervisor**

Dr Irmantas Kašalynas

Head of Terahertz Photonics Laboratory

Center for Physical Sciences and Technology

Email: irmantas.kasalynas@ftmc.lt

**General Contact Person at FTMC:**

**Dr Kristina Plauškaitė Šukienė**

**Department of Scientific Information and Doctoral Studies**

Center for Physical Sciences and Technology

Email: kristina.plauskaite@ftmc.lt

**General Contact Person of the Project:**

Dr Andreas K. Klein

TERAOPTICS Project Manager

University Duisburg-Essen

Email: andreas.k.klein@uni-due.de

Please state subject “TERAOPTICS APPLICATION ESR 9”. You MUST indicate whether or not your personal details can be shared with the respective project partners within the TERAOPTICS ITN in your application email. Without your consent we will not forward your personal data.

**Duration**

36 months (48 months)

**Research Fields**

Physics – Optoelectronics – Photonics – Terahertz Technology – Semiconductors – Material Engineering.

**Keywords**

Terahertz, Optoelectronics, THz detectors, emitters, systems, diffractive optics.

**Career Stage**

Early Stage Researcher (ESR) or 0-4 years (postgraduate)

**Key dates**

Application closing date: 01 October 2020 (or until filled).

The project will formally kick off on 01 September 2020 and so we are looking to have ESR starting on this date or soon thereafter, preferably within 6 months of this start date at the latest.

**Acknowledgment**

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956857.

#### [**REQUIREMENTS**](https://euraxess.ec.europa.eu/jobs/547266#bootstrap-fieldgroup-accordion-item--requirements-1)

#### **Offer Requirements**

* **REQUIRED EDUCATION LEVEL**

Physics: Master Degree or equivalent

Technology: Master Degree or equivalent

Other: Master Degree or equivalent

* **REQUIRED LANGUAGES**

ENGLISH: Excellent

#### **Skills/Qualifications**

Skills in applied physics, solid-state material research, work experience with laboratory equipment, cleanroom facilities, computer programing, experiment planning and execution, report writing.

**TERAOPTICS Abstract**

The European Training Network (ETN) TERAOPTICS - Terahertz Photonics for Communications, Space, Security, Radio-Astronomy, and Material Science will train a new generation of creative, innovative and entrepreneurial early-stage researchers (ESR) in the field of THz Photonics able to transform new ideas, groundbreaking research and advanced technologies into innovative THz products and services for a sustainable economic and social development in the targeted application areas: communications, space, security, radio-astronomy and material science. TERAOPTICS will raise excellence in THz Photonics by integrating a structured research program and doctoral training. It will extend the traditional academic research setting by incorporating open and inter-disciplinary research elements in an international and inter-sectorial network environment consisting of solely renowned, highly experienced and equipped academic and non-academic beneficiaries in the field of Terahertz Photonics (4 universities, 2 research institutes, 3 SMEs, and 2 industry) and 13 academic and non-academic partners. TERAOPTICS will enhance the career perspectives of the ESRs through international, interdisciplinary, and inter-sectorial mobility combined with an innovation-oriented mindset.

Terahertz (THz) radiation, generally defined as electromagnetic radiation in the frequency range 0.3–3 THz, is attracting considerable interest owing to potential applications in high-bandwidth and high-data-rate THz communications, satellite-to-satellite wireless links, THz spectroscopy for discovering star building in radio astronomy, high-resolution imaging and localization for security and in general for non-destructive material characterization and identification. Because of very recent scientific breakthroughs such as photonics mediated generation of ultra-low phase noise THz signal generation, THz Photonics is seen as a key enabling technology for a variety of applications. Thus, the overall research goal of the TERAOPTICS network is to overcome current and internationally recognized scientific challenges to advance the Terahertz field while training the new generation and researchers and innovators. More specifically research-wise, the project aims to exploit the fundamental scientific knowledge of the breakthroughs to develop photonic mediated semiconductor-based THz sources, THz mixers, and THz detectors and integrated functional receivers and transmitters for future mobile THz systems in the targeted application fields.

The overarching objective of TERAOPTICS is to provide high-level training in the field of THz Photonics to a new generation of high achieving early stage researchers to provide them an inspiring research program and intellectual, scientific, technical and transferable skills trainings to enhance their career opportunities in academia and industry and to create the new generation of excellent, creative and risk-taking researchers and engineers. This goal will be achieved by a unique, internationally renowned, interdisciplinary and inter-sectorial network of academic and non-academic beneficiaries and partners providing both formal (workshop-style) and informal (hands-on) research training in a most stimulating professional environment, non-academic placements and scientific conferences.