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BOOK OF ABSTRACTS

The Progress of the ERDF Project "The Development of Quantum Optics and Photonics at the University of Latvia" (refinanced Horizon 2020 ERA Chairs project)

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The University of Latvia (UL) is implementing European Regional Development Fund Project No. 1.1.1.5/19/A/003 "The Development of Quantum Optics and Photonics in the University of Latvia" (Project) [1]. The realisation period of the project's activities is 01.05.2019–30.11.2023. The budget of the Project is EUR 2.5 million (85% covered by the European Regional Development Fund and 15% covered by the State budget). The Project was initially submitted to the Horizon 2020 call "WIDESPREAD-04-2019: ERA Chairs" and was scored above the threshold.

The objective of the Project is to attract a high-level research leader (ERA Chair) who will develop quantum optics and photonics at the University of Latvia and thus will raise the research quality and international recognition of the UL. The project has the following work packages: WP1. Selection and Recruitment of an ERA Chair; WP2. Selection, recruitment, and personnel management of an ERA Chair's research team; WP3. Research activities of an ERA Chair and his/her team; WP4. Preparation of competitive project proposals; WP5. Strategy development and implementation of structural changes; WP6. Communication, Networking, and Dissemination; WP7. Management. The main expected results of the Project and their achievements so far are summarised in Tab. 1.

Tab. 1. *The main expected results of Project No. 1.1.1.5/19/A/003 and the achievements as of 31.05.2021*

Expected result	**To be achieved during the Project, by 30.11.2023**	**Achieved till 31.05.2021**	**Achieved till 31.05.2021, %**	**Planned to be achieved by the end of 2021**
ERA Chair holder recruited (agreement)	1	1	100%	1
ERA Chair scientific group recruited (agreements)	4	4	100%	4
Publications submitted	24	9 (8 published)	33%	> 20
Project proposals submitted	6	5 (1 funded)	83%	> 7
Patents applied	2	0 in progress	0%	0 in progress

Expected result	To be achieved during the Project, by 30.11.2023	Achieved till 31.05.2021	Achieved till 31.05.2021, %	Planned to be achieved by the end of 2021
Lecture course prepared	1	0 in progress	0%	0 draft version prepared
Human Resources Strategy for Researchers prepared	1	0 in progress	0%	0 in progress
Strategy for the Development of Quantum Optics and Photonics at the University of Latvia prepared	1	0 in progress	0%	0 draft version prepared
International conferences organised	2	1	50%	1

The Project has an international Advisory Board which, within a Selection Committee, launched an open international competition for the ERA Chair position [2] and evaluated the candidates. Finally, Dr. Rashid Ganeev was selected and recruited as the ERA Chair in Quantum Optics and Photonics at the University of Latvia. R. Ganeev is a highly productive researcher with a total number of publications (SCOPUS) 504 and H-index (SCOPUS) 47. He is the author of eight monographs. His research topics cover quantum optics and photonics, including research on resonance-induced processes of single high-order harmonic enhancement in different metal plasmas, time-resolved plasma characterisation with spectral, morphological, and harmonic issues, studies of the nonlinear refraction, and nonlinear absorption in nanoparticles suspensions. The ERA Chair's main tasks are to develop quantum optics and photonics at the UL, lead the ERA Chair research group, prepare new project proposals, develop Strategies, and implement structural changes at the UL to achieve excellence on a sustainable basis. To implement R. Ganeev's research activities, a Laboratory of Nonlinear Optics at the Institute of Astronomy, UL was established.

The core research team of the ERA Chair has been selected in an international competition and is formed by Jānis Alnis (Latvia; whispering gallery mode resonator sensors), Uldis Bērziņš (Latvia; atomic spectroscopy), Javed Iqbal (Canada, Pakistan; laser-produced plasma), and Vyacheslav Kim (United Arab Emirates, Uzbekistan; high-order harmonic generation). R. Ganeev leads this research group and supports the career development of its members.

During the Project, various new project proposals have been prepared. In 2020, two project proposals were submitted to Horizon 2020 FET Open and RISE calls, two project proposals to the Latvian Council of Science call, and one project proposal for

ERDF Activity 1.1.1.1. call. The previously submitted project No. 1.1.1.1/20/A/070 "Next generational technology for high purity crystal growth using MHD pseudo levitation" was approved for funding. In 2021, an ERC Advanced grant proposal is being prepared by R. Ganeev (submission deadline August 2021), Horizon EUROPE Teaming project (expected submission deadline Fall 2021), and Latvian Council of Science projects (submission deadline August 2021) are under preparation. Horizon EUROPE Teaming Project (6 years, 15 million EUR from the European Commission + 15 million EUR from National funding) is considered as a proper continuation of an ERA Chair project.

The Project aims to implement structural changes at the UL that will allow to form and keep research excellence on a sustainable basis. For this, the "Strategy for the Development of Quantum Optics and Photonics at the University of Latvia" and "Human Resource Strategy" will be developed. Project members are involved in working groups to prepare a "Strategy of the University of Latvia 2021–2027". R. Ganeev is providing his competence on research article preparation. Actions have been taken to mobilise the research community of the UL in the field of quantum optics and photonics. Joint research seminars in the House of Science of the UL will be launched. New partnerships with foreign research institutions – the Center for Soft Nanoscience, University of Münster (Germany), and Sapienza University of Rome (Italy) – were created for joint research and project preparation.

R. Ganeev is preparing a lecture course "Nonlinear Optics of Plasmas" for physics students of the UL. It is expected that this course, together with other publicity activities of the ERA Chair, will raise the attractivity of quantum optics and photonics, and will grow human resources in this field for the benefit of research and industry. The National Science Platform (NSP) FOTONIKA-LV as an initiator of the Project, holds a network of photonics companies in Latvia. This network will be employed to launch industry-driven research topics and new technologies.

Actual information is on the Project web page – https://www.erachair.lu.lv.

References

[1] Atvars, A. (2019). ERA Chair in Quantum Optics and Photonics. Project proposal to H2020-WIDESPREAD-2019-4 call. In: Abstract book. The 3rd International Conference FOTONIKA-LV "Achievements and Future Prospects", Riga, Latvia, 24–25 April, pp. 46–48. https://www.lu.lv/fileadmin/user_upload/lu_portal/projekti/fotonika-lv/ERA_Chair/2015_Conference_FOTONIKA-LV.pdf

[2] EURAXESS announcement "Principal investigator – ERA Chair in Quantum Optics and Photonics". https://euraxess.ec.europa.eu/jobs/442744 (1st competition), https://euraxess.ec.europa.eu/jobs/536042 (2nd competition).