# Project Description − Part B[[1]](#footnote-1)

**1.1. Participants (applicants)**

Please provide the following information (if available):

 a short[[2]](#footnote-2) description of each Science and Research Organization (SRO) and its main tasks, with an explanation of how its profile matches the tasks in the proposal;

Vinča Institute of Nuclear Sciences (INNV) is regarded as Serbia’s leading scientific institute in fundamental and applied research, owing to its size, scientific productivity, international reputation in research, and the quality of its scientific personnel and research facilities. INNV is a member of the University of Belgrade and the scientific staff of the Institute significantly contributes to the process of knowledge exchange in science-education model in Serbia. Over the past seventy years, more than 1000 Ph.D thesis have been made at the Institute. Today, the Institute with 311 researchers and 210 Ph.D. students is the host for 73 national projects and more than 60 international projects classified as EU H2020, IEAE, COST, EUREKA, Erasmus+, Bilateral, as well as other international scientific research collaborations in which the Republic of Serbia is a member.

The Faculty of Sciences and Mathematics (UNFSM), University of Niš, has been a credible educational institution for years, involved in both national and international research and innovation projects. UNFSM educates students in the fields of mathematics, computer science, physics, chemistry, biology and ecology, and geography. Over the past five years, the Faculty has participated in 38 national and 18 international projects, as well as in COST actions and bilateral projects. The Faculty is currently involved in 11 international projects (H2020, Erasmus+, COST, bilateral research projects). Also, the Faculty has been involved in European and global programs of academic mobility and exchange at all levels. Furthermore, the Faculty has experience in the coordination of science promotion projects and has been a significant contributor, participant, and coordinator of the European Researchers' Night in the previous years.

The Faculty of Electrical Engineering, University of Niš (FEE-UNI; www.elfak.ni.ac.rs) is an accredited HE and SRO institution with a long experience in participating in a number of national and international research projects, funded by the Ministry for Science, EU and industry. It has 284 employees, of which there are 165 teaching staff in 10 departments. Working space of FEE-UNI is 22970m2 and includes more than 40 laboratories with modern measurement and computer equipment for teaching and research. Construction of a 7000m2 Multifunction Laboratory Annex at the FEE-UNI is going to be finished by the end of 2020 and it will further extend teaching and research capacities.

The School of Electrical Engineering at the University of Belgrade was established in 1948. ETF is a top educational and scientific institution in the field of  electrical engineering,  computer science, photonics and nanomaterials. More than 1,000 students enrol in BA, MS and PhD programmes every year.  In particular, ETF group involved in this proposal has provided  significant contributions in the field of semiconductor devices and  nanostructures. To reach this goal, a specialized Center for nanostructures, nanoelectronics and nonophotonics (3N Center) was opened. The most noticeable achievements of the ETF group are related to  the optimization of the optical properties of nanostructures. This  group has established a host of numerical simulation techniques for the  so-called "quantum engineering" that was applied in the design and  optimization of the structural parameters.

Project consortium features a unique combination of disciplines: nonlinear photonics (INNV, FEE-UNI), quantum optics (UNIFS) and quantum nanomaterials (ETF). LIGHTMat brings together theoretical groups from INNV, which have been recognized for innovative approach in modeling and describing the dynamics of solitary patterns in nonlinear photonic structures and Bose-Einstein condensates, and group from ETF, which pioneered development of quantum cascade laser based platform for design of the functional quantum devices. Together, INNV and ETF advanced the design of chiral THz metamaterial devices for control of light in THz regime. The group from UNIFS will be involved through the theoretical study of quantum interference effects in heterostructures such as EIT and LWI which are targeted by the project regarding the design of efficient light storage devices. The FEE-UNI will mostly participate in the application of machine learning in the prediction and control of light in photonic lattices, optimization and automatization in designing functional devices. The partners have already an established collaboration as testified by joint publications. Each of them has a crucial role in obtaining the very challenging objectives of the project ranging from theoretical investigations of efficient light storage mechanism by confronting the quantum interference and topological effects (UNIFS, INNV), light control by synergy between the topological and nonlinear effects in topological photonic structures (INNV,UNIFS,FEE-UNI), and managing ultrashort laser pulses by quantum metamaterials (ETF, INNV), to the numerical design of efficient topological charge switchers, optical modulators, sensors and light combiners (INNV, ETF, FEE-UNI, UNIFS). For each of these roles the partners selected are considered leaders in their field.

 a short curriculum vitae of the PI and the key members of the project team – working packages coordinators[[3]](#footnote-3), including:

* a list of up to five publications[[4]](#footnote-4) relevant to the Project for the PI and each key member of the project team;
* a list of up to five relevant previous projects or activities, connected to the subject of this proposal for the PI and each key member of the project team;
* if applicable, a list of up to five products, services, and/or other achievements relevant to the Project for the PI and each key member of the project team.

**Dr. Aleksandra Maluckov** (PI) received the Ph.D. degree in 2001 from School of Mathematical and Physical Science, SOKENDAI- Graduate University for Advanced Studies, Hayama, Japan. She was employed as an Associate Professor at Department of Physics, Faculty of Natural Sciences, University of Nis, from 2007-2012, when she joined Vinca Institute of Nuclear Sciences where she is currently employed as a Principal Research Fellow. Her research interests include nonlinear dynamical systems, nonlinear and quantum optics and complex systems. Currently her research is focussed on the fundamental questions of localization and thermalization phenomena in photonic and ultracold atomic systems. She co-authored 82 articles in refereed journals, more than 20 conference papers and two university books. Aleksandra participated in 2 national and 2 international projects (H2020 RISE and trilatal) and 1 COST action (MC member) and was a member of organizing and scientific committees of Symposium in Plasma Physics and Ionized Gases (SPIG, 2002) and organizing committee of PHOTONICA2015 and PHOTONICA2019. She had taught and coordinated several undergraduate courses, master and PhD courses at the Department of Physics, Faculty of Natural Sciences, University of Nis, and supervised numerous BSc, 1 MSc student and 3 PhD students. She has been appointed as Visiting Researcher at the National Institute for Fusion Sciences, Japan 2006, Texas A&M University at Qatar,Doha, Qatar. 2012 and 2013, Department of Physics, Universidad de Chile, Santiago de Chile 2018, and Physics of Complex Systems group at Institute for Basic Sciences, Republic of Korea 2017 and 2020. Her h-index is 20 according to the Web of Science, and her work has been cited more than 500 times (without self-citations). Aleksandra is a member of the Optical Society of Serbia.

*Employment history:*

(2012 – …) Principal Research Fellow, Vinca Institute of Nuclear Sciences, University of Belgrade, Serbia

(2007-2012) Associate Professor, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(2002 – 2007) Assistant professor, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(1997 – 2002) Teaching Assistant, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(1992 – 1997) Junior Assistant, Department of Physics, Faculty of Sciences and Mathematics,University of Niš, Serbia

*Selected relevant publications in the past 5 years:*

1.G. Gligoric, D. Leykam, A. Maluckov, Influence of different disorder types on Aharonov-Bohm caging in the diamond chain, Physical Review A 101, 023839 (2020).

2. T. Mithun, A. Maluckov, K. Kasamatsu, B. A.Malomed, A. Khare, Modulation instability, inter-component asymmetry, and formation of quantum droplets in one-dimensional binary Bose gases, Symmetry 12 (1), 174 (2020).

3. C. Hermann-Avigliano, I. A. Salinas, D. A. Rivas, B. Real, A. Mančić, C. Mejía-Cortés, A. Maluckov, R. A. Vicencio, Spatial rogue waves in photorefractive SBN crystal, Optics Letters 44, 2807 (2019).

4.G. Gligoric, P. Belicev, D. Leykam, A. Maluckov, Nonlinear symmetry breaking of Aharonov-Bohm cages, Physical. Review. A 99, 013826 (2019).

5. A. Mancic, F. Baronio, Lj. Hadzievski, S. Wabnitz, A. Maluckov, Statistics of Manakov Roque Waves, Physical Review E 98, 012209 (2018).

*Selected projects:*

(2017-..) MC member for CA16221 (AtomQTech) – COST action "Quantum Technologies with Ultra-Cold Action Propos Atoms"

(2010-2019) CARDIALLY, Horizon ITN RISE

(2014-2017) Participation in the trilateral project Sweden-Chile-Serbia “Control of light and matter waves propagation and localization in photonic lattices” (Swedish Research Council, grant 2013-6752).

(2011-present) III Project “Photonics of micro and nanostructured materials”, Ministry of Education, Science and Technological development of Republic of Serbia, subproject leader

(2006- 2010) Project “Complex Phenomena in Plasma Physics, Condensed Matter Physics and Nonlinear Optics’, Ministry of Science and Technological Development of Republic of Serbia.

(2002- 2005) Project “Complex Phenomena in Fusion Plasmas”, Ministry of Science and Technological development of Republic of Serbia

*Refereeing and organizational activity:*

Referee for Physical Review Letters, Physical Review A,B,E, Optical and Quantum Electronics, Physica A,E.

**Dr. Goran Gligorić** (P1) is Senior Research Associate currently employed at the Vinča Institute of Nuclear Sciences, Belgrade, Serbia. He received his PhD. degree from School of Electrical Engineering at University of Belgrade, on the subject “Dynamics of localized modes in Bose-Einstein condensates in optical lattices”. His main research area is physics of complex systems, with special interests for complex phenomena in nonlinear photonics and ultra-cold atom systems. In the last few years his research of interest is extended to studying the influence of synthetic spin-orbit interactions and synthetic magnetic fields on localization properties in photonic lattices with special geometry. He is co-author of 41 papers published in international peer reviewed journals and 6 contributed papers published at academic conferences. According to the Web of Science his Hirsh index is 13 with 373 citations (without self citations). He supervised one PhD student, participated in 3 national, 2 bilateral, 1 trilateral and 2 COST actions. He was a member of the organization committee of PHOTONICA2015 and PHOTONICA2019 and lead guest editor in SCI journal Optical and Quantum Electronics. He has been appointed as Guest Scientist at the Max Planck Institute for the Physics of Complex Systems in Dresden (Germany) from 2010 till 2012. Dr. Gligorić is the deputy president of the Optical Society of Serbia. His strong experience in the field of analytical and numerical study of nonlinear phenomena in photonic systems will be useful in the problems that will be covered mainly in WP2, and partially in WP1 and WP4.

*Employment history:*

(October 2015 - present) Senior Research Associate at INNV

( June 2010– October 2015) Senior Research Assistant at INNV

(October 2010 - November 2012) Guest Scientist at the Max Planck Institute for the Physics of Complex Systems, Dresden, Germany

(June 2008 – June 2010) Research Assistant at INNV

(September 2004 – June 2008) Research Student at INNV

*Selected relevant publications in the past 5 years:*

1. [G. Gligorić, P. P. Beličev, D. Leykam, A. Maluckov, Nonlinear symmetry breaking of Aharonov-Bohm cages, Physical Review A 99, 013826 (2019)](https://journals.aps.org/pra/abstract/10.1103/PhysRevA.99.013826)

2. G. Gligorić, A. Radosavljević, J. Petrovic, A. Maluckov, Lj. Hadžievski, B. A. Malomed, Models of spin-orbit-coupled oligomers, Chaos 27, 113102 (2017)

3. A. Radosavljević, G. Gligorić, P. P. Beličev, A. Maluckov, M. Stepić, Light propagation in binary kagome ribbons with evolving disorder, Physical Review E 96, 012225 (2017)

4. G. Gligorić, A. Maluckov, Lj. Hadžievski, S. Flach, B. A. Malomed, Nonlinear localized flat-band modes with spin-orbit coupling, Physical Review B 94, 144302 (2016)

5. P. P. Beličev, G. Gligorić, A. Radosavljević, A. Maluckov, M. Stepić, R. A. Vicencio, and M. Johansson, Localized modes in nonlinear binary kagome ribbons, Physical Review E 92, 052916 (2015).

*Selected projects:*

1. (2011 – 2020) National project: “Photonics of micro- and nano-structured materials”, Ministry of Education, Science and Technological Development of the Republic of Serbia (III 45010)
2. (2017 - ) CA16221 (AtomQTech) – COST action "Quantum Technologies with Ultra-Cold Action Propos Atoms"
3. (2015 - 2019) HORIZON2020 RISE project: Capturing and quantitative analysis of multi-scale multi-channel diagnostic data - CARDIALLY (Ref. no. 691051)
4. (2014-2019) MP1403 (NQO) – COST action “Nanoscale Quantum Optics"
5. (2014 – 2016) Sweden-Chile-Serbia trilateral project: “Control of light and matter waves propagation and localization in photonic lattices” (Swedish Research Council, grant 2013-6752)
6. (2013-2015) Italy-Serbia bilateral project “Multi-State Atom Interferometers” (RS13MO10)
7. (2012-2013) Germany-Serbia bilateral project: “Breaking symmetry and all optical light routing in complex photonic lattices” (DAAD 680-00-00095/2012-09/5)
8. (2008 – 2010) National project: “Physics of complex phenomena in plasmas, condensed matter and nonlinear optics”, Ministry of Science of Serbia (P 141034)

*Refereeing and organizational activity:*

1. Referee for Physics Review Letters, Physics Review A and E, Physics Letters A, Optical and Physica Scripta.
2. Lead guest editor at Optical and Quantum Electronics.

**Dr. Petra Beličev** (P2) is a Senior Research Associate currently employed at INNV as a member of PSTAR group (Group for Photonic Science, Technology, Applications and Research). She received her PhD degree from ETF, on the subject “Propagation of light in complex photonic lattices with saturable nonlinearity”. Her main research area is modelling and theoretical investigation of photonic components and systems. In particular, her research is related to analysis of energy localization phenomena in various discrete photonic systems (such as linear and nonlinear waveguide arrays), and EM wave interactions with metamaterials. She has co-authored 30 SCI papers with h-index 10 and 120 citations (SCOPUS), and took participation in six international and two national scientific projects. She supervised one Ph.D. student and several undergraduate research projects. She has been appointed as Visiting Researcher at the Helmut Schmidt University Hamburg, Germany (2010, 2012), Texas A&M University at Qatar,Doha, Qatar (2013) and Aston University, Birmingham, UK (2018). In the period from 2013 - 2017, P. Beličev was a Management Committee Substitute Member of two COST actions: TERA-MIR Radiation: Materials, Generation, Detection and Applications (COST MP 1204) and European Network for Skin Cancer Detection using Laser Imaging. Dr. Beličev is a member of the Optical Society of Serbia and UNESCO - National Committee for celebration of the International Day of Light. She has been organizer of one national and two international conferences on photonics, whereas a chairperson of the 7th International School and Conference on Photonics – PHOTONICA2019. Her responsibilities on LIGHTMat are related to tasks relevant for realization of WP2, WP3, WP5 and coordination of WP4 due to her broad experience in modelling and simulations of various photonic systems for light beam propagation control, as well as engagement in organization of various dissemination activities.

*Employment history:*

(October 2018 - present) Senior Research Associate at INNV

(February 2015 – October 2018) Senior Research Assistant at INNV

(January 2008 – February 2015) Research Assistant at INNV

*Selected relevant publications in the past 5 years:*

1. G. Gligorić, P. P. Beličev , D. Leykam and A. Maluckov, Nonlinear symmetry breaking of Aharonov-Bohm cages, Physical Review A, vol. 99, 013826 (1-6), (2019).
2. D.B. Stojanović, P.P. Beličev, J. Radovanović and V. Milanović, [Numerical parametric study of chiral effects and group delays in Ω element based terahertz metamaterial](javascript:void(0)), Physics Letters A, vol. 383, 1816-1820 (2019).
3. D. B. Stojanović, P. P. Beličev , G. Gligorić and Lj. Hadžievski, Terahertz chiral metamaterial based on twisted closed ring resonators, Journal of Physics D: Applied Physics, vol. 51, 045106 (1-7), (2018).
4. N. Raičević, M.D. Ivanović, P.P. Beličev, J.S. Petrović, Monitoring of respiratory volumes by an long period grating sensor of bending, Journal of Physics: Conference series 682 (2016).
5. P. P. Beličev, G. Gligorić, A. Radosavljević, A. Maluckov, M. Stepić, R.A. Vicencio and M. Johansson, Localized modes in nonlinear binary kagome ribbons, Physical Review E, vol. 92, 052916 (1-11) (2015).

*Selected projects:*

1. (2011 – 2019) National project: “Photonics of micro- and nano-structured materials”, Ministry of Education, Science and Technological Development of the Republic of Serbia (III 45010), coordinator of the project task.
2. (2017 – 2019) Danube Region Strategy project: “Laser micro- and nano-structuring of materials for biomedical sensing” (BMBF-JIVE, Ref. no. 1206.004-16), participant.
3. (2015 - 2019) HORIZON2020 RISE project: Capturing and quantitative analysis of multi-scale multi-channel diagnostic data - CARDIALLY (Ref. no. 691051), sub-project coordinator.
4. (2017 – 2018) Central European Initiative project: Know-how Exchange Program “Development and Regulation of the University of Belgrade Laser-Laboratory Infrastructure for Education and Research” (Ref. no. 1206.004-16), participant.
5. (2014 – 2016) Sweden-Chile-Serbia trilateral project: “Control of light and matter waves propagation and localization in photonic lattices” (Swedish Research Council, grant 2013-6752), participant.
6. (2013 -2017) “European Network for Skin Cancer Detection using Laser Imaging“, COST action BM1205, MC substitute member.
7. (2013 -2016) “TERA-MIR Radiation: Materials, Generation, Detection and Applications“, COST action MP1204, MC substitute member.

*Refereeing and organizational activity:*

1. Referee for Europhysics Letters, Optics Communications, Optical and Quantum Electronics and Physica Scripta.
2. Secretary of the Organizing Committee of National conference Photonica2009, international conference PHOTONICA2011 and Chairperson of the international conference PHOTONICA2019.
3. Secretary of the National Coordination Committee of UNESCO – International Year of Light 2015.

**Dr. Ljiljana Stevanović** is a full professor at the Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia. She holds a Ph. D. degree in Physics from Faculty of Physics, University of Belgrade, Serbia in 2004. Subject of her Ph. D. thesis belongs to the area of atomic and molecular physics. The research interest of Dr Ljiljana Stevanović is also in the field of quantum confined systems and quantum optics. She is co-author of 15 papers published in international peer-reviewed scientific journals, 3 papers published in national peer-reviewed scientific journals and 9 contributed papers published at international conferences. Total number of citations without the citations of co-authors, according to Scopus, is 120. She has participated in 2 national projects and one COST Action. She has taught several undergraduate, master and PhD courses at the Faculty of Sciences and Mathematics, University of Niš, Serbia and supervised several MSc thesis. Dr Ljiljana Stevanović was a supervisor of the Ph. D. thesis entitled “Coherent effects in interaction of the confined hydrogen atom with electromagnetic field”, with the subject in the field of quantum optics, defended in 2017. at the Faculty of Sciences and Mathematics, University of Niš, Serbia. Her research interests are closely related to the activities in WP 1. She has a successful cooperation with the PI through participation in the same international COST project.

*Employment history:*

(2019 – present) Full Professor, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(2014 – 2019) and (2009 – 2014) Associate Professor, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(2004 – 2009) Assistant-Professor, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(1997 – 2004) Teaching Assistant, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

(1991 – 1997) Junior Assistant, Department of Physics, Faculty of Sciences and Mathematics, University of Niš, Serbia

*Selected relevant publications in the past 5 years:*

1. Lj. Stevanović, N. Filipović, V. Pavlović, Slow light pulse propagation through spherical quantum dot with on-center hydrogen impurity in magnetic field, Physica E 118, 113883 (2020).

2. Lj. Stevanović, N. Filipović, V. Pavlović: Electromagnetically induced transparency in degenerate ladder-type system, Optical and Quantum Electronics 50, 287 (2018).

3. V. Pavlović, M. Šušnjar, K. Petrović, Lj. Stevanović: Electromagnetically induced transparency in a multilayered spherical quantum dot with hydrogenic impurity, Optical Materials 78, 191 (2018).

4. V. Pavlović, Lj. Stevanović: Group velocity of light in a three level ladder-type spherical quantum dot with hydrogenic impurity, Superlattices and Microstructures 100**,** 500 (2016).

5. V. Pavlović, Lj. Stevanović: Electromagnetically induced transparency in a spherical quantum dot with hydrogenic impurity in the external magnetic field, Superlattices and Microstructures 92**,** 10 (2016).

*Selected projects:*

1. (2011 – 2020) National project: “A new approach to the problems of quantum mechanics foundation from the aspect of application in quantum technologies and interpretations of signals of different origin”, Ministry of Education, Science and Technological Development of the Republic of Serbia (OI 171028)

2. (2017 – present) COST Action CA 16221: Quantum Technologies with Ultra-Cold Atoms

3. (2009 – 2010) National project: “Quantum mechanics of open systems”, Ministry of Science and Technological Development of the Republic of Serbia (no. 141016)

*Refereeing and organizational activity:*

Referee for Journal of Physics B, Canadian Journal of Physics, Optoelectronics and Advanced Materials-Rapid Communications, Photonics and Nanomaterials: Fundamentals and Applications, Journal of Electronic Materials.

**Dr. Jelena Radovanović** was born in Belgrade, Serbia, in 1973. She received the B.Sc. degree (five years program) in 1997, the M.Sc. degree (two years program) in 1999, and the Ph.D. degree in 2001, all in electrical engineering, from the School of Electrical Engineering, University of Belgrade, Belgrade Serbia, where she is currently employed as a Full Professor. Her research interests include optical properties of semiconductor nanostructures, modelling of quantum cascade lasers and semiconductor-based metamaterials, as well as tunneling properties of complex photonic heterostructures. Prof. Radovanović has co-authored more than 200 scientific articles, out of which 95 articles in refereed international journals, 115 conference papers, two monographs, one book chapter and two university textbooks. She has participated in 5 national and 10 international projects. She has taught and coordinated several undergraduate courses, master and PhD courses at the School of Electrical Engineering, University of Belgrade and supervised numerous BSc, MSc students and 11 PhD students. She has been appointed as Visiting Professor at the School of Electronic and Electrical Engineering, University of Leeds, UK, in 2012, 2014 and 2015-2019. Her h-index is 12 according to the Web of Science, and her work has been cited 315 times (without self-citations). Prof. Radovanovic is one of the founders and currently the President of the Optical Society of Serbia, as well as a member of the Scientific Society of Serbia (Department of Technical Sciences).

*Employment history:*

• (1. 12. 2015–present) Full Professor, School of Electrical Engineering, Department of microelectronics and engineering physics, University of Belgrade, Serbia; Vice-Head of the Department

•(2010–2015) Associate Professor, School of Electrical Engineering, Department of microelectronics and engineering physics, University of Belgrade, Serbia

•(2005–2010) Assistant-Professor (full-time), School of Electrical Engineering, Department of microelectronics and engineering physics, University of Belgrade, Serbia

•(2002–2005) Research Associate, Institute of Physics, Center for Solid State Physics and New Materials, Belgrade, Serbia

•(2001–2005) Assistant Professor (part time contract), School of Electrical Engineering, Department of Microelectronics and Engineering Physics, University of Belgrade

• (1.12. 2003 – 1.3.2004) Visiting Research Fellow, Institute of Microwaves and Photonics, School of Electronic and Electrical Engineering, University of Leeds, UK

• (2000-2001) Research Assistant, Institute of Physics, Center for Solid State Physics and New Materials, Belgrade

• (2000-2001) Teaching Assistant (part-time contract), School of Electrical Engineering, Department of Microelectronics and Engineering Physics, University of Belgrade

• (1997–1999) Research Assistant, School of Electrical Engineering, Department of Microelectronics and Engineering Physics, University of Belgrade, Serbia

*Selected relevant publications in the past 5 years:*

1. D. B.Stojanović, P. P Beličev, J. Radovanović, V. Milanović, Numerical parametric study of chiral effects and group delays in Ω element based terahertz metamaterial, Physics Letters A. 383, 1816 (2019).

2. N. Vukovic, J. Radovanovic, V. Milanovic, D. L. Boiko, Low-Threshold RNGH Instabilities in Quantum Cascade Lasers, IEEE J. Sel. Top. Quantum Electron. 23, 1 (2017).

3. N. Vukovic, J. Radovanovic, V. Milanovic, D. L. Boiko, Analytical expression for Risken-Nummedal-Graham-Haken instability threshold in quantum cascade lasers, Optics Express 24, 26911 (2016).

4. S. Radosavljević, J. Radovanović, V. Milanović, Tunneling times in bianisotropic, dispersive and absorptive metamaterials, Physics. Letters A 380, 4008 (2016).

5. D. B. Stojanović, J. Radovanović, V. Milanović, Delay times in a terahertz chiral metamaterial slab, Physical Review A 94, 023848 (2016).

*Selected projects:*

1)2011. - 2019, sub-project coordinator of the Integral and Interdisciplinary Project of the Ministry of Education and Science entitled "Photonics of micro and nano structured materials" (ev. no III 45010).

2) 2014. –2017„Ultrafast Infrared Emitter on a Quantum Cascade – FastIQ“, Swiss National Science Foundation (SCOPES, Joint Research Projects, ref. no. IZ73Z0\_152761), Principal investigator for the Serbian partner

4) 2012. –2016. project Co-director for the Serbian partner, NATO Science for Peace and Security Programme, Trace-Gas Sensor Monitoring, full project title “Terahertz QCL Based Spectrometer for Rapid Detection of Chemical Agents and Explosives” , ref. no. ISEG.EAP.SFPP 984068.

7) 2013. -2017. “European Network for Skin Cancer Detection using Laser Imaging“, COST action BM1205, MC member, core group member, STSM coordinator.

8) 2013. -2016. “TERA-MIR Radiation: Materials, Generation, Detection and Applications“, COST action MP1204, MC member.

*Refereeing and organizational activity:*

• Expert of the European Comission, appointed as a member of several expert pools and panels comprising diverse expert groups for the evaluation of R&D proposals under different calls in FP7 and Horizon202, also engaged as an independent reviewer (monitor) on currently funded projects by the European Commission.

• Referee for Physical Review B, Journal of Applied Physics, Optics Express, Physica Status Solidi B, Nanoscale Research Letters, Journal of Renewable and Sustainable Energy, IEEE Journal of Photovoltaics, Optical Materials, European Physical Journal B, Optical and Quantum Electronics, Physica E, Optics Communications, Applied Optics, Applied Physics A, PLoS ONE, Photonics, Journal of Computational Electronics, ACS Photonics

• Referee for the national conference of ETRAN, and international conferences MIEL, Photonica09, NUSOD 2008 (Nottingham, UK), Photonica2011, META 2012

**1.2. Ethics and Security**

**1.2.1. Ethics**

* Fill-out the Ethics issues table (Table 1.2.1).

**Table 1.2.1 Ethics issues table.**

|  |  |
| --- | --- |
| **1. HUMAN EMBRYOS/FOETUSES** | YES/NO/N/A |
| Does the proposed research involve human Embryonic Stem Cells (hESCs)? | NO |
| Does your research involve the use of human embryos? | NO |
| Does your research involve the use of human fetal tissues /cells? | NO |
| **2. HUMANS** | YES/NO/N/A |
| Does your research involve human participants? | NO |
| Does your research involve vulnerable persons or groups? | NO |
| Does your research involve persons unable to give informed consent (including children/minors)? | NO |
| Does your research involve physical interventions on the study participants? | NO |
| Does your research involve a clinical trial? | NO |
| If yes, please confirm that approval from Ethics Board of Serbia (EOS) and Medicines and Medical Devices Agency of Serbia (ALIMS) will be obtained prior to study commencement? | NO |
| Will the clinical trial be registered in a publicly registry? | NO |
| **3. HUMAN CELLS / TISSUES** | YES/NON/A |
| Does your research involve human cells or tissues (other than from Human Embryos/Fetuses)? | NO |
| **4. PERSONAL DATA** | YES/NO/N/A |
| Does your research involve personal data collection and/or processing? | NO |
| Does your research involve further processing of previously collected personal data (secondary use)? | NO |
| If any potentially commercially exploitable results may be based upon tissues or samples derived from human participants, will appropriate informed consent be sought? | NO |
| **5. ANIMALS** | YES/NO/N/A |
| Does your research involve animals? | NO |
| **6. ENVIRONMENT & HEALTH and SAFETY** | YES/NO/N/A |
| Does your research involve the use of elements that may cause harm to the environment, to animals or plants? | NO |
| Does your research deal with endangered fauna and/or flora and/or protected areas? | NO |
| Does your research involve the use of elements that may cause harm to humans, including research staff? | NO |
| **7. DUAL USE** | YES/NO/N/A |
| Does your research involve items that are normally used for civilian purposes, but may have military applications or may contribute to the proliferation of weapons of mass destruction, or involve other items for which an authorization is required? | NO |
| **8. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS** | YES/NO/N/A |
| Could your research raise concerns regarding the exclusive focus on civil applications? | NO |
| **9. MISUSE** | YES/NO/N/A |
| Does your research have the potential for misuse of research results? | NO |
| **10. OTHER ETHICS ISSUES** | YES/NO/N/A |
| Are there any other ethical issues that should be taken into consideration? Please specify! | NO |

In addition to 1.2.1 Ethics issues table, if your answer was YES to any of questions, you must fill out and submit information in Table 1.2.1.a and/or Table 1.2.1.b, required by the Science Fund of the Republic of Serbia depending on whether your research involve use of animals and/or human participants or material. If your answers to all questions from Table 1.2.1 were NO, you can delete Table 1.2.1.a and Table 1.2.1.b and proceed to Section 1.2.2 Security.

**Table 1.2.1.а – Information required for research involving the use of animals**

|  |  |
| --- | --- |
| **Information** | **Fill-out the information required if your research involves the use of animals. Replace the instructions in the table with your answers. The table headings on the left should be kept throughout the document. The instructions on the right side should be removed and replaced with text.** |
| Ethical Statement | Indicate the nature of the ethical review permissions, relevant licenses and national or institutional guidelines for the care and use of animals that cover the research. SF will require evidence that relevant ethical and regulatory approval has been granted prior to the award commencing. |
| Study Design | For each experiment, give brief details of the study design including: a) The number of experimental and control groups.  b) Any steps taken to minimize the effects of subjective bias when allocating animals to treatment (e.g. randomization procedure) and when assessing results (e.g. blinding).  c) The experimental unit (e.g. a single animal, group or cage of animals.  d) The number of times each animal will be measured. |
| Experimental animals | a) Provide details of the animals used, including species, strain, sex, developmental stage and weight. Include a sound scientific reason for these choices.  b) Provide further relevant information such as the source of animals, international strain nomenclature, genetic modification status (e.g. knock-out or transgenic), genotype, health/immune status, drug or test naïve, previous procedures, etc. |
| Sample Size | a) Specify the total number of animals used in each experiment, and the number of animals in each experimental group.  b) Explain how the number of animals was calculated. Provide details of any calculation used for sample size.  c) Indicate the number of independent replications of each experiment, if relevant. |
| Experimental Outcomes | Details regarding the experimental outcomes to be assessed. |
| Planned statistical analysis | An explanation of how the number of animals was calculated, including power calculations, if appropriate, or other supporting information to demonstrate that the findings will be robust.  A brief overview of the planned statistical analyses in relation to the choice of sample size, along with details of any statistical advice available. |

**Table 1.2.1.b – Information required for research involving the use of human participants or material**

|  |  |
| --- | --- |
| **Information** | **Fill-out the information required if your research involves the use of animals. Replace the instructions in the table with your answers. The table headings on the left should be kept throughout the document. The instructions on the right side should be removed and replaced with text.** |
| Ethical Approval | Ethical approval is required for all research work funded by SF that involves human participants or human material (including tissue). Please state by whom and when the research program will be reviewed and specify any other regulatory approvals that have been obtained or will be sought. Applicants should allow sufficient time to obtain Ethical approval. SF will require evidence that relevant ethical and regulatory approval has been granted prior to the award commencing. |
| Study Recruitment | Please provide specific details on study recruitment procedures including inclusion and exclusion criteria and informed consent procedures. These should include relevant, additional details for specific groups including children/minors, patients and vulnerable groups. |
| Clinical Research Infrastructure | Please provide specific details where you have access to, or plan to access, the support/services of a Clinical Research Facility/Centre (CRF/C) at study design and/or implementation phase. The following information must be provided:  • Name and address of the CRF/C  • Information on the nature and stage/s of the input/advice/collaboration/service  • Rationale for the choice of facility/centre  Information on the costs of providing the service/input, setting out where this is provided in-kind, from additional funding or requested from the project budget. Evidence of this support/service must be provided to SF in the form of a letter from the Director of the facility at the time of application for funding. |
| Clinical Trials | SF will only support trials that are fully approved by the Medicines and Medical Devices Agency of Serbia (ALIMS). Applicants are responsible for ensuring that all necessary approvals are in place and provided to SF prior to study initiation.  • **Sponsor**: Plans for appropriate sponsorship arrangements must be included in the application i.e. Letters of Support must be provided from sponsors or potential sponsors. Please note that SF cannot act as sponsor.  • **Study Registration**: Please outline plans for the registration of their trial or investigation on a publicly available, free to access, searchable clinical trial or investigation registry such as the Register for Clinical Trials in the Republic of Serbia (ALIMS) or International Standard Randomized Controlled Trial Register (ISRCTN) or ClinicalTrials.gov. |
| Human Cells/Tissues | Please provide details on the cells or tissues types, including the source of the material. |
| Biobanking | Please describe how you will comply with international best practice for biobanking components in this research, with particular regard to quality of sample collection, processing, annotation and storage, and describing data protection measures where appropriate. Please also reference relevant guidelines/standards you will use. |
| Protection of Personal Data | Compliance with national legislation and EU rules on data protection is required. Please provide that appropriate safeguards will be put in place and provide examples e.g. details of the procedures for data collection, storage, protection, retention, transfer, destruction or re-use (including, collection methodology (digital recording, picture, etc.), methods of storage and exchange. |

Describe and explain in detail how you intend to address the issues in the previous tables, in particular as regards:

* + - research objectives
    - research methodology

Provide documents that you need under the national law (if you already have them), e.g.:

* + an ethics committee opinion;
  + document notifying activities raising ethical issues or authorizing such activities.

*If these documents are not in English, you must also submit an English summary of the documents (containing, if available, the conclusions of the committee or authority concerned).*

*If you plan to request these documents for the project you are proposing, your request must contain an explicit reference to the project title.*

*If you have initiated a request for these documents, which are pending at the time of submission of your proposal, please make a reference to the authority concerned and the expected decision date. Please bear in mind that approval from the Ethical Board must be obtained and submitted in a timely manner, with project proposal documentation. Exceptions from this rule must be approved by the Science Fund and ethical approval must be submitted before the experiment begins.*

*If you have obtained/prepared any of the above documents, you should attach them as an additional documentation.*

*The Science Found requires evidence that relevant ethical and regulatory approval has been granted for studies involving human or animal subjects as well as human cells/tissues prior to research commencing.*

*The PI is obliged to contact the Ethical Board and obtain guidance for applicants on ethical and scientific issues. If ethical approval is not required, the PI must state in the application that the proposed study does not require approval of the Ethical Board.*

*Should any serious and/or unexpected adverse events occur during the project implementation, the PI is obliged to inform the Science Fund in written form and/or if relevant submit a copy of the written report to the responsible ethical board and/or attach a copy of the report of the competent ethical board.*

*The approved experiment must be completed within the stipulated term of the License. PI is obliged to inform SF if approval for extension of the License is submitted to the Ethical Board.*

* + 1. **Security[[5]](#footnote-5)**

**Please indicate if your project will involve activities or results raising security issues.**

This may include technologies that gather or use information for surveillance, technologies, ideas, products or other outputs intended for military use, other issues pertaining to security. (YES/NO)

*If you have answered yes, please elaborate.*

1. All information in Part B is mandatory (including the filled out form). Inaccurate and/or incomplete information will result in disqualification. [↑](#footnote-ref-1)
2. Provide key information about the SRO(s) participating on the project; use up to 1,000 characters per each SRO. [↑](#footnote-ref-2)
3. The short curriculum vitae should contain information about education, employment, research or academic title, research field/area, number of citations (excluding self-citations) and Hirsch index from SCOPUS or WoS citation databases. Research or academic title should correspond to the List of Research and Academic Titles in Higher Education available at [http://fondzanauku.gov.rs/](https://eur03.safelinks.protection.outlook.com/?url=http%3A%2F%2Ffondzanauku.gov.rs%2F%3Fpost_type%3Dakona-portfolio%26p%3D6231%26preview%3Dtrue&data=01%7C01%7Cmara.zivkov%40fondzanauku.gov.rs%7C27e89f67790348bf704808d77269bf5c%7Ce9869d9e5f16415689b0d51630ff7000%7C1&sdata=qBXrDftcNsVRr9F0GxbMAkAg82PTfyvltUMVB9mtKNs%3D&reserved=0). Awards, prizes, skills and other information relevant to the Project, not included into other parts of Section 1.1 of this document, could be entered where applicable. [↑](#footnote-ref-3)
4. Please provide a list of up to 5 selected publications relevant to the Project. **Do not attach or list a full bibliography.** [↑](#footnote-ref-4)
5. For more information on the classification of information, please refer to the Horizon 2020 guidance: <https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf>. [↑](#footnote-ref-5)