Summary of outcomes of the project: FP7-REGPOT-2011-1. FOTONIKA-LV, Nr. 285912, Unlocking and Boosting Research Potential for Photonics in Latvia – Towards Effective Integration in the European Research Area

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The Project aimed at unlocking and boosting R&D&I potential for photonics at the University of Latvia (LU). Project activities had a national impact both in research potential as well on the larger society and the emerging high technology industry in Latvia also impacting the enlarged European Union through the numerous links and associations and project activities with partners across the ERA. The direct beneficiary of the Project is the Association FOTONIKA-LV formed in April 24, 2010 (www.lu.lv/FOTONIKA.LV, www.FPOTONIKA-LV.eu by a bottom up initiative of three well recognized institutes of the University of Latvia:

Institute of Atomic Physics and Spectroscopy, www.asi.lv ;

Institute of Astronomy, www.astr.lu.lv and the

Institute of Geodesy and Geoinformatics, www.lu.lv.

The 10 laboratories, departments and observatories of the member institutes (*9 counted when project started and the laboratory of Quantum Optics opened during the implementation of the project*) involve more than 100 researchers: including 4 Professors, 45 with PhD degrees, more than 10 skilled technicians, more than 30 PhD candidates and MSc level students.

Implementation of the Project has resulted in the transformation of the Association FOTONIKA-LV into the emerging National Science Centre FOTONIKA-LV at the University of Latvia taking national leadership in quantum sciences, space sciences and related technologies under the framework of photonics. In particular enhancement of research and outreach activities covered basic and applied sciences of photonics domain: optics, optoelectronics; in atmosphere and space; Earth geodesy; laser ranging and remote sensing; atomic and molecular physics; laser spectroscopy and plasma light sources and bio-photonics. The outcomes of the project implementation resulted in transformation of association FOTONIKA-LV in to the National Research centre FOTONIKA-LV at the University taking national leadership in quantum sciences, spaces sciences and related technologies under the framework of photonics.

Moreover, NSC FOTONIKA-LV *"de facto"* being unique in Latvia and in the three Baltic states is promoting a bottom-up initiative to elevate pan-Baltic regional smart specialization in the domain Photonics, Quantum Sciences, Space Sciences and Related Technologies. All three countries has excellent research outcomes in the domain and a community of more than 60 research driven SMES in the sector with turnover in 2014 close to 150 M € with historical and forecast growth in the range of 15% annually.

Objectives reached and tasks implemented during the Project resulted in outcomes listed under the following major topics identified below as A through H:

A) Results of collaboration, sharing of knowledge ands skills gained:

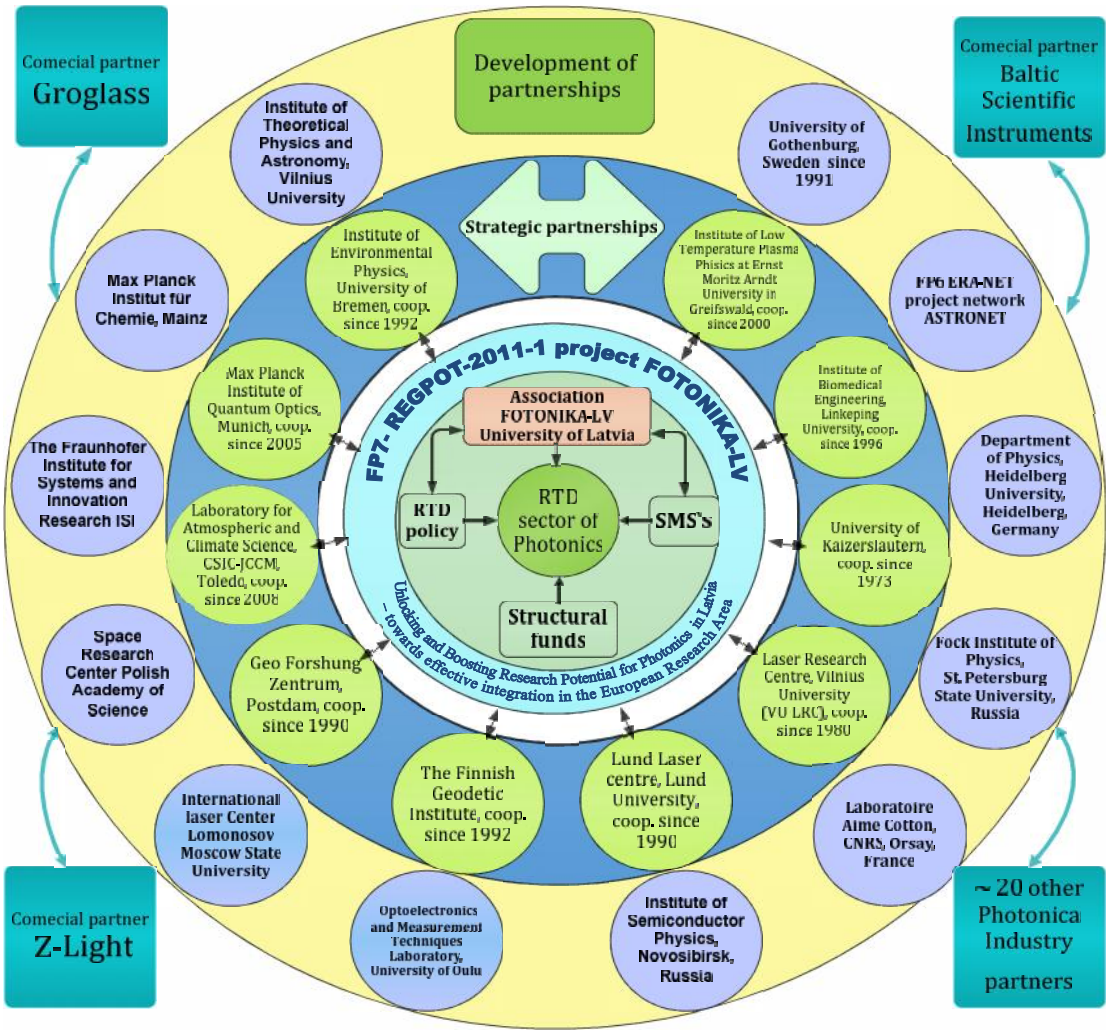
- Ten named in strategic partnerships for project proposal with leading research centers in Finland (1), Sweden (3), Germany (4), Spain (1), Lithuania (1). These initiative were further activated through more than 50 secondment visits, joint research efforts and joint project design work. In addition 23 more partnerships were intensified via secondments and FP7 IRSES projects with

partners in Germany (3), Austria (3), France (2), Sweden (1), Poland (1), Finland (1), Lithuania (1), Russia (4) Ukraine (3), Belarus (2) ; Australia (1), Canada (1);

- Special attention was devoted to collaboration and assistance to industry in the photonics domain. More than 20 research-driven SMEs are in cooperation with FOTONIKA-LV. Eight of which have received corporate project development support including assistance in the preparation of ten H2020 SME Instrument project proposals. Two projects have been financed and the others received marks above 12 from 15.. An additional six new SME project proposals are expected to be submitted by the end of 2015.

Figure 1 Illustrates partnerships intensity for the research community of FOTONIKA-LV

Figure 1.



- Particularly noteworthy among many joint research achievements and synergy outcomes *(resulting from the "critical mass" achieved by FOTONIKA-LV cross disciplinary teams*) is the negative ion beam instrument GRIBA should be mentioned specifically. The Instrument was built via joint efforts of research teams from FOTONIKA-LV and Gothenburg University during secondment visits. Due to it's specific design that permits mobility GRIBA is the first next generation instrument in ion beam technologies in the world (*value per money more than 500 000 euro*). Its significant advantage is that it can be shipped and emplaced at CERN, Fermilab, European Spallation Source or any of the major atomic physics instruments in the world.

B) ***Publication in peer reviewed journals, conference reports, organization of conferences and workshops and thesis defended:***

- The project resulted with more than 100 publications in peer review journals and more than 20 articles in preparation;
- The project supported publication of 5 books;
- During the course of the project four large scale conferences, two summers schools and 2 exhibitions for SMEs;
- The project financed participation in 33 conferences but in total research community of FOTONIKA-LV presented research results in more than 75 international conferences with more than 110 oral or poster presentations among them many published in conference thesis booklets, conference books or in conference proceedings ;
- 4 seminars on patenting and IP protection, an 8 week course on the TRIZ innovation methodology was developed and conducted, training on Math-lab, 85 colloquiums on research and science policy issues, and one strategy planning foresight workshop were organized;
- Besides planned the Project supported the organization of two additional international conferences;
- 10 PhD theses were defended and several more are pending.

C) Persistent efforts in new project design resulted as following:

- Five project proposals prepared for FP7 calls were retained for financing and in two of them FOTONIKA-LV is a coordinator;
- 16 project proposals (14 in the role of coordinator) prepared for FP7 calls *(but not retained for financing will be further elaborated and resubmitted to HORIZON 2020 calls or elsewhere);*
- Partnership in 27 project proposals for H2020 *(among them 10 coordinat*ed) 2 project proposals were retained for financing, others are pending for resubmission. 6 project proposals are submitted to H2020 calls by the end of September 2015;
- In total the research team of FOTONIKA-LV used opportunities to apply to 12 various sources of research funding.

The more important HORIZON 2020 project proposals from the total of 27 that have been prepared are:

- Financed project H-2020 INFRAIA-1-2014-2015 *(Advanced Research Networks) "EUROPLANET 2020")*;
- Two proposals to H2020-FETOPEN-2014-2015-RIA (*one marked 4.5 from 5, but not financed and another one pending for evaluation)*;

- Three FET-OPEN project proposals submitted to H2020-FETOPEN-2014-2015-RIA call with deadline September 29, 2015
- Two proposals to H2020-MSCA-ITN-2014, *(marked 80 from 100 in the first submission, 88.5 as resubmitted proposal and now pending for the third resubmission ;*
- Submitted project to WIDESPREAD 2014–1 TEAMING call in the role of coordinator, but not financed and will be submitted to the next call;
- Two projects submitted to WIDESPREAD 2014–1 ERA-Chairs, but not financed and will be resubmitted.
- The project proposal submitted to WIDESPREAD 2014–1 Teaming call having excellent mark "12" from 15 , not financed and will be resubmitted.
- The first in history of FOTONIKA –LV ERC Advanced grant proposal submitted to the deadline June 2015 and pending for evaluation.

In summary these activities resulted in systematization a lot of information for the resubmission or new project design.

7 excellent project proposals were submitted to the Latvian Science Council call with international per review evaluation for basic research activities. The lowest scores were 68 and 71, but the highest ones were 84, 80, 79 and 78 from 90 as maximum. Unfortunately success rate in this national competition was about 7% and proposals from FOTONIKA-LV teams failed to receive financing.

6 proposals were submitted to ERAF and ESF calls of EU Structural funds in Latvia and 4 were financed.

D) ***Applied research initiatives towards commercialization of outcomes:***

Applied research activities during the implementation of the FOTONIKA-LV project resulted in active contacts with SMEs in Latvia, Lithuania and Estonia. In addition to above mentioned project proposals for H-2020 calls by FOTONIKA-LV or is members institutes there are more than ten commercially oriented initiatives in various stages of technology readiness (TRL) - from prototypes to elaboration stages above 6-8. Unfortunately severely limited institutional funding from the national budget does not allow the authors and innovators further elaboration towards higher technology readiness levels or, to perform feasibility studies and relevant search for IPR efforts. That means weak capacity in applied research efforts discouraging the formation of spin-offs.

- This is a problem painful to Latvian science community and was highlighted by the TECHNOPOLIS expert team that was invited to perform an international evaluation of Latvian science where the reviewers highlighted the quality of the association FOTONIKA-LV as well as the quality of three associated institutes:

Latvia. Innovation System Review and Research Assessment Exercise: Final Report, TECHNOPOLIS, April 20, 2014, ***see page 22***:

> *"Only 17% of research funding is institutional (ERAWATCH Country Report, 2011), making Latvia's one of the most highly 'contested' systems in the world. While there is no clear international benchmark for what the proportion of institutional funding should be, there is some consensus that 50% is the minimal viable level. The Finnish Research and Innovation Council recently observed that the share of competitive funding in the university research system has recently approached that value and that to do any further would be dangerous*

Low relative levels of institutional funding are normally argued to undermine continuity, the ability to invest in facilities and equipment and therefore ultimately quality. ***A degree of institutional funding stability is also a requirement in order to establish good links with industry.*** *Without this, it is hard to be a credible research partner for the longer term"*.

E) ***International evaluation of the institutes of Association FOTONIKA-LV and it's institutes by TECHNOPOLIS expert group -****Latvia: Research Assessment Exercise, Report Panel M: Natural Sciences and Mathematics, Technopolis January 2014* ***See text*** *in page 75:*

"In April 2010, three institutions of the University of Latvia (Atomic Physics and Spectroscopy, Astronomy and Geodesy and Geoinformatics) established the association FOTONIKA –LV with the aim to take responsibility for sustainable advancement of the sector of photonics in Latvia. The association submitted an ambitious FP7 project of basic and applied research in traditional and innovative fields of photonics: REGPOT– 2011-1 which was eventually granted €3.8million. Other laboratories should follow this example".

TECHNOPOLIS experts view on the Institute of Atomic Physics and Spectroscopy, see on page 29-31

Overall Score

Citation: *" The overall score of this laboratory (4) is justified by a very good level of basic and applied research, the initiative to federate three Laboratories in the association FOTONIKA-LV with the goal of a sustainable development of photonics in Latvia and the submission of an ambitious project to the FP7 call of proposals REGPOT and obtaining 3.8million LVL. In addition the institution has good links with the emerging industry, a large development potential and a dynamic management".*

Quality of research

Citation: *"The basic research is well integrated into various applied research fields of multidisciplinary nature. The research in photonics is highly relevant at national and international level. The importance of the work span from national research areas including the development of devices for pollution control (Hg), and development of optical fibers; regional cooperation in EU funded projects as well as wider international level in areas spanning from theoretical background studies in laser pulse interactions".*

TECHNOPOLIS experts view on the Institute The Institute of Astronomy, *see pages 25-28 in above referred report.* ***Citations:***

"The Institute of Astronomy performs research on stars and interstellar medium, microwave sources at Sun and asteroids in the Solar System. It updates and maintains General Catalogue of Galactic Carbon Stars. The Institute runs a satellite laser ranging system (SLR, which has been in substantial part designed on the site) and a permanent GPS station. SLR and GPS stations, working with high accuracy, are involved in international service, define the origin of the Latvian national geodetic coordinate system and tie it to international reference frames. The Institute provides design of small optical systems, and software support and construction of laser ranging equipment for its own use, and also for international collaborators….

…. The Institute shows a good level of scientific research, especially in the field of navigation which is an area important both for Latvia and the international community. It should increase its internal visibility by stronger use of its potential (good infrastructure and skilled scientists) for extending research portfolio to more up-to-date research topics. Current

international exchange and activity in attracting national funds are not satisfactory. The REGPOT 'FOTONIKA-LV project and Latvia's accession to the European Space Agency create perspectives for further development of the Institute ….

… As already mentioned above, a very strong side of the Institute is its experimental base and especially skills in calculation and design of equipment for laser ranging systems, spectrographs and optical components for telescopes. In the past high precision instruments designed and constructed by scientists from the Institute were used for observatories in many countries. These traditional skills have been used recently in construction of scientific equipment for Germany, Japan and Finland….. "

TECHNOPOLIS experts view on the Institute of Geodesy and Geoinformation see citation on page 33:

TECHNOPOLIS experts view on the Institute of Geodesy and Geoinformation see citation on page 33:

Citation: *"Both the quantity and the quality of the research, measured in term of the publication output, are insufficient, resulting in limited impact on the scientific discipline. The activities are largely focused on market oriented research projects and short-term contracts …."*

Quality of research

Citation: *"The numbers of research staff and funds allocated are insufficient to perform research of interest to the international research community…"*

Impact on the scientific discipline

Citation: *"Although a group is small, it has experience that can be exploited by numerous research groups within the national and international research communities. Complementary knowledge available for earth observation studies as well as environmental studies in general should further be exploited. The involvement of the research group in networks has proven to be effective and useful (for example EUPOS). But because of the meager publication record and obscure publication fora, the Institute has not had any impact on the scientific discipline."*

F) ***Reversing "brain drain" into the "brain gain"*** :

The project achieved a significant success in reversing Latvia's "brain drain" in to the "brain-gain" that can be a model for other research institutes and for the Latvian government that has set a goal of doubling the number of researchers from 2013 levels by 2020. This is a critical problem for Latvia insofar as goals relating to smart specialization require significant expansion of research activities yet the number of researchers in Latvia actually declined from 2013 to 2014 and there is no sign of improvement on the way, other than initiatives such as this project. Project activities resulted in the recruitment and repatriation of18 researchers. The University has new leadership and the new rector is making a strong effort to retain the majority of the staff that has been recruited.

- Dr.Hab. Uldis Berzinsch has been repatriated from Sweden to Latvia. He has excellent expertise in basic research and 10 years expertise in research labs in industry. His contribution in the design of mentioned above ion beam instrument GRIBA was substantial and two peer-review publication resulted from his research activities. Unfortunately illness prevented him to be active during the last year of the project;
- Dr.Aigars Ekers repatriated back to Latvia for the second time. He was the first M-C fellow from Latvia and in his first return founded the Laser Center at the University. He was pressed to leave

Latvia for the second time during the crises years and was back for year February 1, 2012 to April -2014 and headed the Institute of Atomic Physics and Spectroscopy. Now he is recruited by the Saudi Arabia. He accepted financially very favorable offer facing uncertainty for future and lack of re cognition of his contribution to the development of research activities and research infrastructure from the State Authorities, the Ministry of Science and Higher Education and University administration. Facing such attitude his choice is reasonable - having family with four children and wife with Dr degree who was not able to find relevant employment position in Latvia

- Dr.Janis Alnis *(having two M-C fellowship grants*) was repatriated back from the Max Plank Institute of Quantum Optics in Munich where previously he was associated with the team of Nobel prize winner prof. Theodor Hänsch. Dr. Janis Alnis founded the Quantum Optics Laboratory at FOTONIKA-LV;
- High level technician Janis Blahins was repatriated back from Israel and his contribution to applied research initiatives are impressive;
- An additional four experienced researchers were repatriated: D. Phys. Ilja Fescenko, industrial researcher Dr. Phys Mikelis Svilans(P), planetary scientist Dr.Amara Graps and futurist Vidvuds Beldavs who initiated the International Lunar Decade initiative that is picking up increasing international support. 11 foreign researchers were recruited for the work in FOTONIKA-LV labs from Russia (1), Ukraine (2), Cuba(1), Bulgaria (2), South Africa(1), India (1) and Lithuania (3)

G) *Development and upgrade of research infrastructure*:

- instrumentation and components that enabled FOTONIKA-LV research laboratories to to keep leadership in five following fundamental research domains:

1) Experimental research of sophisticated phenomena in ion and molecular physics using advanced ion and molecular beam instrumentation;
2) Research in quantum optics domain;
3) UV and vacuum UV, spectroscopy targeting basic research on atomic and molecular physics;
4) Ground segment of space technologies and astrophysical research;
5) Geodesy and geomatics.

- The project resulted in significant strengthening of the following research infrastructure objects including two large observatories, three advanced laboratories and other experimental apparatus:
  - Renovated and upgraded SLR station of Fundamental Geodynamical Observatory *(value per money more than 500 000 €)*;
  - Prototype for new generation of SLR stations designed *(value per money more than 1 M €);*
  - Renovated wide field Schmidt system type telescope of Astrophysical Observatory *(value per money more than 13M)* in Baldone (one of 10 largest in Europe, largest in Baltic region);
  - Advanced Digital Zenith Camera *(telescope*) designed combining resources with structural funds project *(value per money more than 500 000 €)*;
  - Negative ions beam laboratory for research on negative ions of astrophysical interest and clusters related atmosphere physics problems *(value per money more than 500 000 €)*;
  - Upgraded Molecular beam laboratrory *(value per money more than 500 000 €)*.
- Strong efforts were made and relevant resources used to restore previously lost basis for industrial oriented research including:

- Electron-beam and resistive evaporation of dielectric, semiconductor and metal using multilayer achromatic optical coating installation - VU-2M with simultaneous photometric layer testing *(value per money more than 500 000 €)*;
- High quality small and cost effective clean room is build for sputtering experiments and for other technology needs; development of inductively coupled plasma technologies for basic and fundamental research;
- Capacity of optomechanical (*as well as quartz-glass technologies*) workshop restored for the needs of technologically complicated experiments.

H) **The Public-access Riga Photonics Centre** is opened, has run for outreach events in Latvia including Year of Light publicity in 2015 . The Center provides support to the SME community with exhibitions, conferences, training events, and consultations on H2020 calls. During the project outreach activities were held including science experience programs and activities for high school students *(nearly 600 attended programs)*. Additionally, Photonics Day activities were conducted that included a startup entrepreneur's meet up.

The extended version of this report having ANNEXES with figures and tables is located in attached file!

ANNEX 1.

Selection of Peer Reviewed Scientific Publications 2012-2015 of NSC FOTONIKA-LV research community structured by journals in alphabetic order

(Authors linked to NSC FOTONIKA-LV community are underlined in the listing)

Books (authors or editors)

1. W. Leal Filho, Arnolds Ubelis, Dina Berzina. (eds.), Sustainable Development, Knowledge Society and Smart Future Manufacturing Technologies, World Sustainability Series, DOI 10.1007-978-3-319-14883-0_5;
2. Jānis Klētnieks "Astronomija un ģeodēzija Latvijā līdz 20. gadsimtam" , Rīga, LU Akaddēmiskais apgāds, ISBN 978-9984-45-850-2, 415 lpp., (2014)
3. Vilks "Astronomijas vārdnīca", Rīga, LU Akadēmiskais apgāds, ISBN 978-9984-45-857-1, 272 lpp. (2014)
4. Alexander Theodor Narbut, Classical TRIZ. Project's Manual, 2015, 144.p. ISBN978-9984-45-994-3

SCI Journals and others

Journal Title *Impact factor*

http: www.citefactor.org-journal-impact-factor-list-2014_N.html

Acta Biomaterialia **5.684**

1. Gross KA, Muller D, Lucas H, Haynes DR. Osteoclast resorption of thermal spray hydoxyapatite coatings is influenced by surface topography. Acta Biomaterialia. 2012;8(5):1948-56.
2. Saber-Samandari S, Gross KA. Contact nanofatigue shows crack growth in amorphous calcium phosphate on ti, co-cr and stainless steel. Acta Biomaterialia. 2013;9(3):5788-94.
3. Saber-Samandari S, Alamara K, Saber-Samandari S, Gross KA. Micro-raman spectroscopy shows how the coating process affects the characteristics of hydroxylapatite. Acta Biomaterialia. 2013;9(12):9538-46

Annalen der Physik **3.05**

4. Precision spectroscopy of the 2S‐4P transition in atomic hydrogen on a cryogenic beam of optically excited 2S atoms, Axel Beyer · Janis Alnis · Ksenia Khabarova · Arthur Matveev · Christian G. Parthey · Dylan C. Yost · Randolf Pohl · Thomas Udem · Theodor W. Hänsch · Nikolai Kolachevsky . Annalen der Physik 525 (8-9), 671-679 (2013), 10.1002/andp.201300075.

Astronomy & Astrophysics **4.153**

5. J. Kalvāns, I. Shmeld, Modeling of the processing of icy mantles of interstellar dust-grains by energetic particles, Astronomy & Astrophysics, 2013, 554, A111, 12 pages

Baltic Astronomy **0.919**

6. Kalvāns Juris, Shmeld Ivar. The Effect of an Inert Solid Reservoir on Molecular Abundances in Dense Interstellar Clouds. Baltic Astronomy, 2012,Vol. 21, Nr.4, p. 447-454
7. Bezrukov, D. A., Ryabov, B. I., and Shibasaki, K.: 2012,"Isolated sunspot with a dark patch in the coronal emission", Baltic Astronomy 21, 509-516

8. Docenko D. The use of Multiwavelenght Archival Observational Data for Scientific Discoveries: ACase of the Supernova remnant Cassiopeia A. – Baltic Astronomy, vol 21, 517-522,2012
9. Matrozis E., Začs L., Barzdis A., "High resolution spectroscopy of carbon-rich and metal-poor star HD 209621", Baltic Astronomy, 21, 399-420, 2012.
10. Docenko D. Modeling of Highly-Excited Atomic level Populations in Astrophysical Plasmas, Baltic Astronomy, 22, 363-371, 2013.

Beilstein Jornal of Nanotechnology **2,326**

11. Chaaya AA, Viter R, Bechelany M, Alute Z, Erts D, Zalesskaya A, Zalesskaya A, Kovalevskis K, Rouessac V, Smyntyna V, Miele P. Evolution of microstructure and related optical properties of ZnO grown by atomic layer deposition. Beilstein Journal of Nanotechnology. 2013;4(1):690-8

Cosmic Research **0.348**

12. Bogod V.M., Peterova N.G., *Ryabov B.I.*, Topchilo N.A.: 2015, Cosmic Research, 53, 1,

CrystEngComm **3.858**

13. Garskaite E, Gross K-, Yang S-, Yang TC-, Yang J-, Kareiva A. Effect of processing conditions on the crystallinity and structure of carbonated calcium hydroxyapatite (CHAp). CrystEngComm. 2014;16(19):3950-9

European Cells and Materials **4.887**

14. Petzold C, Haugen H, Gross KA. Designing hydroxyapatite coating topography at the micro and nano level. European Cells and Materials. 2013;26(SUPPL.6):147

European Physical Journal D **1.398**

15. Formation of Multiple Bright and Dark States in Hyperfine Levels of Na via Autler-Townes Effect", T. Kirova, M. Bruvelis, A.Cinins, K. Miculis, A. Ekers, D. Efimov, N. N. Bezuglov, I. I. Ryabtsev, and M. Auzinsh, to be submitted to European Journal Physics D

Frontiers in optics

16. **Roman Viter** , **V. Smyntyna**, **Nickolaj F Starodub**, **Igor Doycho, Sergey Geveluk, Yulia Ogorodniichuk, Arnolds Ubelis, Alla Tereshchenko, Igor Konup, Janis Blahins** . ZnO nanorods room temperature photoluminescence biosensors for salmonella detection. Frontiers in Optics (FiO) 2012/ Laser Science (LS) XXVIII 14-18 October 2012

Geodesy and Cartography

17. Abele M, Balodis J, Janpaule I, Lasmane I, Rubans A, Zariņš A. Digital zenith camera for vertical deflection determination. Geodesy and Cartography. 2012;38(4):123-9
18. Janpaule I, Jäger R, Younis G, Kaminskis J, Zariņš A. DFHRS-based computation of quasi-geoid of Latvia. Geodesy and Cartography. 2013;39(1):11-7.
19. Ansis Zariņš, Inese Janpaule & Jānis Kaminskis (2014) On reference star recognition and identification, Geodesy and Cartography, 40:4, 143-147, DOI: 10.3846/20296991.2014.987456;
20. Jānis Balodis, Ansis Zariņš, Diāna Haritonova & Inese Janpaule (2014) Parameters for automated star identification, Geodesy and Cartography, 40:4, 163-170, DOI: 10.3846/20296991.2014.987457

Hyperfine Interactions **0,21**

21. D.A. Cooke, P. Crivelli, J. Alnis, A. Antognini, B. Brown,S. Friedreich, A.Gabard, T. W. Haensch, K. Kirch, A. Rubbia, V. Vrankovic. "Observation of positronium annihilation in the 2S state: towards a new measurement of the 1S-2S transition frequency" Hyperfine Interact, March 2015, DOI 10.1007-s10751-015-1158-4

International Journal of Emerging Technologies and Application in Engineering, Technology and Sciences (IJ-ETAETS)

22. **Arvind Saxena** Mass Spectrometry of Atomic and Molecular Clusters", International Journal of Emerging Technologies and Application in Engineering, Technology and Sciences (IJ-ETAETS) , special issue, 91-99 (2014)

IEEE Sensors Journal **1.852**

23. **Roman Viter**, Volodymyr Khranovskyy, Nikolay Starodub, Yulia Ogorodniichuk, Sergey Gevelyuk, Zanda Gertnere, Nicolay Poletaev, Rositza Yakimova, Donats Erts, Valentyn Smyntyna and Arnolds Ubelis, Application of Room Temperature Photoluminescence From ZnO Nano-rods for Salmonella Detection, IEEE Sensors Journal, 14(6) DOI: 10.1109-JSEN.2014.2309277, 2014, Page(s): 2028 – 2034

Journal of Astrophysics and Astronomy **0.500**

24. K.N. Arefieff, N.N. Bezuglov, M.S. Dimitriyevic, A.N. Klyucharev, A.A. Mihajlov, V.A. Srećković. "Dynamics Resonances in Atomic States of Astrophysical Relevance". Submitted to Journal of Astrophysics and Astronomy.

International journal of mass spectrometry **2.227**

25. **Arvind Saxena,** Prashant Kumar, S B Banerjee, K P Subramanian, B Bapat, R K Singh and Ajai Kumar, **"**Dependence of ion kinetic energy and charge on cluster size in multi-photon ionization of xenon clusters" ***International journal of mass spectrometry 357, 58-62 (2014)***

Journal of Environmental Engineering and Lanscape Management **1.041**

26. Gravitis, J., Abolinš, J., Tupčiauskas, R., & Veveris, A. (2010). Lignin from steam-exploded wood as binder in wood composites.*Journal of Environmental Engineering and Landscape Management, 18*(2), 75-84

Journal of Physics: Conference Series

27. Precision Spectroscopy of Atomic Hydrogen, A Beyer, CG Parthey, N Kolachevsky, J Alnis, K Khabarova, R Pohl, ..., Journal of Physics: Conference Series 467, p. 012003, 12/2013; DOI:10.1088/1742-6596/467/1/012003

The Royal Society of Chemistry, *J. Mater. Chem* ***4,700***

28. R. Viter, Z. Balevicius, A. Abou Chaaya, I. Baleviciute, S. Tumenas, L. Mikoliunaite, A. Ramanavicius, Z. Gertnere, A. Zalesska, V.Vatman , V. Smyntyna, D. Erts, P. Miele, M. Bechelany, The influence of localized plasmons on the optical properties of Au/ZnO nanostructures. The Royal society of Chemistry, *J. Mater. Chem. C*, 2015, 3, 6815--6821 , DOI: 10.1039/c5tc00964b

Journal of the Mechanical Behavior of Biomedical Materials ***3.048***

29. Saber-Samandari S, Gross KA. Nano-indentation on amorphous calcium phosphate splats: Effect of droplet size on mechanical properties. Journal of the Mechanical Behavior of Biomedical Materials. 2012;16(1):29-37.

Journal of Non-Crystalline Solids **1.77**

30. Mihailova · V. Gerbreders · E. Tamanis · E. Sledevskis · R. Viter · P. Sarajevs. Synthesis of ZnO nanoneedles by thermal oxidation of Zn thin films. Journal of Non-Crystalline Solids 10/2013; 377:212-216. DOI:10.1016/j.jnoncrysol.2013.05.003 ·

J.Opt.Soc.Am.B **1.97**

31. Weilun Hung, Panpan Huang, Feng-Chuan Wu, Martins Bruvelis, Hau-Yl Xiao, Aigars Ekers, Ite A. Yu, "Storage time of cold Rb atoms in an optical dipole trap formed by a multimode fiber laser", J. Opt. Soc. Am. B, /2015; 32(5). DOI:10.1364/JOSAB.32.000B32, http:--www.opticsinfobase.org-josab-upcoming_pdf.cfm?id=231992

Journal of Physics D: Applied Physics ***2.72***

32. I. Fescenko and A. Weis, "Imaging magnetic scalar potentials by laser-induced fluorescence from bright and dark atoms," Journal of Physics D, 04/2014; 47(23). DOI:10.1088/0022-3727/47/23/235001
33. Marcu A, Avotina L, Marin A, Lungu CP, Grigorescu CEA, Demitri N, Kizane G, et al. Laser irradiation of carbon-tungsten materials. J Phys D. 2014;47(35)

Journal of Physical Chemistry **4.835**

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ИЗВЕСТИЯ КРЫМСКОЙ АСТРОФИЗИЧЕСКОЙ ОБСЕРВАТОРИИ

103. Eglitis I. 120 cm Baldone Ceiss telescope.- ИЗВЕСТИЯ КРЫМСКОЙ АСТРОФИЗИЧЕСКОЙ ОБСЕРВАТОРИИ, 2013, 109, Nr 2, 214-216

ANNEX 1.

FOTONIKA-LV: List of Oral and Poster presentations in the conferencies, publication in conference related edition or conference proceedings

1. Eglitis, I.; Kazina, E.; "Investigations of carbon stars with Baldone Schmidt telescope", Fifty years of Cosmic Era: Real and Virtual Studies of the Sky, Proceedings of the Conference of Young Scientists of CIS Countries, held 21-25 Nov 2011, in Yerevan, Armenia. Editors: A.M. Mickaelian, O.Yu. Malkov, N.N. Samus. Yerevan: National Academy of Sciences of the Republic of Armenia (NAS RA), p. 108-113, 2012
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4. K.Lapushka, M.Abele, K.Salminsh, SLR telescope upgrade at Riga station, 17th International Workshop on Laser Ranging and 23rd General Assembly of the International Laser Ranging Service Bad Kötzting (Germany), May 16 - 20, 2011, http:--cddis.gsfc.nasa.gov-lw17-docs-posters-28-Riga_telescope_upgrade.pdf
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6. Arvind K. Saxena, Swaroop Banerjee, Prashnat Kumar, I.A.Prajapati, K.P.Subramanian, Bhas Bapat. **A laser ablation-supersonic expansion source for carbon clusters** (poster), 3 conference in Atomic, Molecular, Optical and Nano Physics (CDAMOP) Delhi university-Delhi (India) (Dec 14-16, 2011)
7. Arvind K. Saxena, Swaroop Banerjee, I.A.Prajapati, K.P.Subramanian, Bhas Bapat. **A modifed ion sputtering source for carbon clusters** (poster), DAE-BRNS Symposium on Atomic Molecular and Optical Physics, Karnatak University, Dharwad (India), (Feb 22-25, 2011)
8. Precision spectroscopy on atomic hydrogen, CG Parthey, A Matveev, J Alnis, A Beyer, R Pohl, K Predehl, T Udem, ..., SPIE Optical Engineering+ Applications, 813202-813202-7 (2011)
9. Precision measurement of the 1S-2S transition in atomic hydrogen, CG Parthey, A Matveev, J Alnis, A Beyer, N Kolachevsky, R Pohl, T Udem, Verhandlungen der Deutschen Physikalischen Gesellschaft (2011)
10. Systematic Frequency Shifts in Spectroscopy of 1s-2s Transition in Atomic Hydrogen, A Matveev, CG Parthey, A Beyer, N Kolachevsky, J Alnis, R Pohl, T Udem, ..., Quantum Electronics and Laser Science Conference, QTuJ6 (2011)
11. Precision spectroscopy on atomic hydrogen, CG PARTHEYIT, A MATVEEV, J ALNIS, A BEYER, R POHL, K PREDEHL, ..., Proceedings of SPIE, the International Society for Optical Engineering (2011)
12. Thermal-noise limited laser stabilization to a crystalline whispering-gallery mode resonator, J Alnis, A Schliesser, C Wang, TJ Kippenberg, TW Hansch, Lasers and Electro-Optics Europe (CLEO EUROPE-EQEC), 2011 Conference on and ...
13. Paeglis R, Bluss K, Atvars A. Driving experience and special skills reflected in eye movements. Proceedings of SPIE - the international society for optical engineering; ; 2011
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    b. M.Ābele, I.Eglītis,L.Osipova, I.Šmelds, "Bīstamo objektu trajektoriju precizēšana ar leņķisko koordinātu, attālumu un radiālo ātrumu mērījumiem"
15. European Space Surveillance Conference June 7 – 9 2011, Madrid, N. Jekabsons, D. Kotlere, M. Nechaeva, I. Smeld, "Mathematical and Algorithmic Description of Software Correlator for Space Debris Data Processing in VIRAC"
16. IAU Symposium 280, The Molecular Universe, May 30 – June 3, 2011, Toledo, Spain, J. Kalvāns, I. Shmeld, " The Effects of Subsurface Chemistry in the Grain Mantles on the Deuterium Chemistry in Molecular Clouds"

17. JENAM-2011, . 4–8 July 2011, European Week of Astronomy and Space Science Saint-Petersburg, Russia, Ivar Shmeld, Maris Abele, Dmitry Bezrukov, Vladislav Bezrukov, Normunds Jekabsons, Maria Nechaeva, Guntis Ozolins, "Space debris radio location observations with Irbene RT-32 telescope"
18. Международная конференция. «Околоземная астрономия-2011» г. Красноярск, 5 – 10 сентября 2011 г., М.Б. Нечаева, Н.А. Дугин, И.К. Шмелд, " Метод РСДБ в приложении к задаче радиолокации объектов в околоземном космическом пространстве"
19. Optical pulse detection using laser light sources. J.Alnis talk at the International conference BIOPHOTONICS IN DERMATOLOGY AND CARDIOLOGY, Riga , 30-31 March 2012.
20. A.Ubelis. IMCS 2012 - The 14th International Meeting on Chemical Sensors, May 20 - 23, 2012, Nürnberg-Nuremberg, Germany
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ANNEX 3.

The Association FOTONIKA-LV at the University of Latvia in the competition for FP7 grants

Table 1. FINANCED PROJECTS,
In total 9 and among them 4 coordinated by FOTONIKA-LV

Nr	Proposal title	Coordinator, Partner from Latvia	Countries Consortia partners	Duration Total in € from EU FOTONIKA-LV in €	Evaluation results
1	**FP7-PEOPLE-2009-IRSES, COLIMA, Nr. 247475** Coherent manipulation of light and matter via interferences of laser-dressed states.	**Coordinator Dr.Phys. Aigars Ekers FOTONIKA-LV University of Latvia**	LV, LT, RU, TW, RU	2010 – 2015 Total 172 800 € **LV- 43 200 €**	80.90 from 100
2.	**FP7-REGPOT-2011-1 FOTONIKA-LV, reg. Nr. 285912**, Unlocking and Boosting Research Potential for Photonics in Latvia – Towards Effective Integration in the European Research Area	**Coordinator Dr.Phys.b Arnolds Ubelis FOTONIKA-LV University of Latvia**	LV	2012-2015 Total 3,752 M€ **LV-3,752 M€**	15 from 15
3.	**FP7-PEOPLES- IRSES, Grant Nr. 294949, NOCTURNAL ATMOSPHERE,** Secondary photochemical reactions and technologies for active remote sensing of nocturnal atmosphere	**Coordinator Dr.Phys. Arnolds Ūbelis FOTONIKA-LV University of Latvia**	LV, DE, UA, RU	2013-2017 Total 209 000€ **LV- 55 100 €**	75.80 from 100
4.	**ENV.2010.4.1.3-2** Global Mercury Observation System , **GMOS, Contr. 265113, ENV.2010.4.1.3-2**	Coordinator: Principal Invest. Dr.Phys. Egils Bogans FOTONIKA-LV University of Latvia	24 partners	2012-2016 Total 292 600€ **LV-157 700 €**	14,5 from 15
5.	INFRA-2011-1.1.19. The Integrated Initiative of European Laser Research Infrastructures III ,L**ASERLAB-EUROPE. Contr.Nr.284464**, **INFRA-2011-1.1.19.**	Coordinator: Principal Invest. Dr.Phys. Jānis Spigulis		2012-2016 Total **LV- 40 500**	93.33 from 100

		FOTONIKA-LV University of Latvia			
6.	**FP7-PEOPLE-2012-IRSES, *BIOSENSORS-AGRICULT.*** *Nr.**316177** - DEVELOPMENT OF NANOTECHNOLOGY BASED BIOSENSORS*	**Coordinator: Dr.Phys. Arnolds Ūbelis FOTONIKA-LV University of Latvia**	LV, SE, FR, UA	2012-2016 Total 292 600 **€.** **LV-157 700 €.**	84.50 from 100
7.	**FP7-ICT-2011-8, Grant. Nr. 318669, ERANET Plus Biophotonics; "**Photonica aappliances for life sciences and health": Two projects of BIOPHOTONICS lab at the LU ASI are retained for finnacing in internal competition of **BiophotonicsPlus**	Coordinator: Principal Invest. Dr.Phys. Jānis Spigulis FOTONIKA-LV University of Latvia	**DE,** LV, BE, DE, ES, IL, IT, UK	2012-2017 LV-145 631 **€.** **Expected About 100 000 €**	12.0 from 15
8.	**FP7-PEOPLES-IRSES-2013**. **Grant. 612691. REFINED STEP**- An international network on new strategies for processing calcium phosphates	Coordinator: Riga Technical University PI. Dr.Phys. Arnolds Ubelis FOTONIKA-LV University of Latvia	LV, FR, UK, AT, BY, RU, CA, AU, TW	2014-2018 Total: 385 700 **€** **LV-25 100 €**	83 from 100
9.	***FP7-PEOPLE-IRSES-2013 GA-2013-612590, "MELINA"*** *"Development of a global network for the real-time detection of failures and extreme events in natural disasters".*	Coordinator: Technical University of Crete, Greece PI-LV :Dr.Phys. Janis Kaminskis FOTONIKA-LV University of Latvia	Greece, LV, China, Hong Kong	2013-2017 Total: 151 200 **€** LV-98 700 **€**	85 from 100

Table 2. Total numbers of FOTONIKA-LV partner Institutions in financed FP7 projects
(Photonics, Quantum Sciences, Space Sciences and Related Technologies) **in various countries in the world**

Country code	No of institutions		Country code	No of institutions		Country code	No of institutions		Country code	No of institutions
AR	1		DK	1		NL	1		TW	1
AT	3		ES	2		NO	1		UA	3
AU	1		FI	1		PL	1		UK	7
BE	1		FR	6		PT	1		ZA	1
BR	1		EL	2		RO	2			
BY	2		HU	4		RU	4			
CA	1		IT	4		SE	4			
CA	1		KE	1		SI	1			
CN	3		KR	1		SK	1			
DE	10		LT	2		SR	1			

Table 3. List of FOTONIKA-LV partner Institutions in various financed FP7 projects

No.	Country code	Organization	Representative	project acronym	time of project
1.	AR	INIBIOMA CONICET Universidad Nacional del Comahue	Maria Del Carmen Dieguez Dr.	GMOS	2010-2015
2.	AT	AIT AUSTRIAN INSTITUTE OF TECHNOLOGY GMBH	Susanne GIESECKE	IFA	2012-2015
3.	AT	INTERNATIONALES INSTITUT FUER ANGEWANDTE SYSTEMANALYSE	Susanne KUPI	IFA	2012-2015
4.	AT	LUDWIG BOLTZMANN GESELLSCHAFT GMBH	Stefan Becker	Refined Step	2013-2017
5.	AU	THE UNIVERSITY OF ADELAIDE	David Haynes	Refined Step	2013-2017
6.	BE	COMMISSION OF THE EUROPEAN COMMUNITIES - DIRECTORATE GENERAL JOINT RESEARCH CENTRE - JRC	Bernd Manfred Gawlik Dr.	GMOS	2010-2015
7.	BR	Associacao Pesquisadores do Experimento LBA	Yara Ferreira Ms.	GMOS	2010-2015
8.	BY	A. V. LUIKOV HEAT AND MASS TRANSFERINSTITUTE OF THE NATIONAL ACADEMYOF SCIENCES OF BELARUS	Sergey Gorbatov	Refined Step	2013-2017
9.	BY	Institute of Biophysics and Cell Engineering, National Academy of Sciences of Belarus	Lyudmila Dubovskaya	BIOSENSORS-AGRICULT	2012-2016
10.	CA	UNIVERSITE DE SHERBROOKE	Francois Gitzhofer	Refined Step	2013-2017
11.	CN	HONG KONG POLYTECHNIC UNIVERSITY	George LIU	MELINA	2013-2017
12.	CN	Institute of Geochemistry, Chinese Academy of Sciences	Xinbin Feng Prof.	GMOS	2010-2015
13.	CN	TONGJI UNIVERSITY	Jicang WU	MELINA	2013-2017
14.	CV	National Institute of Meteorology and Geophysics	Anete Almeida De Brito Ms.	GMOS	2010-2015

15.	CZ	FYZIKALNI USTAV AV CR V.V.I	Karel Jungwirth	LASERLAB-EUROPE	2012-2015
16.	CZ	J. Heyrovsky Institute of Physical Chemistry of the ASCR	Dr Jan ZABKA	ORIGINS	2014-2018
17.	DE	Department for Microbiology and Archaea Center Universitaet	Dr Christine MOISSL-EICHINGER	ORIGINS	2014-2018
18.	DE	FORSCHUNGSVERBUND BERLIN E.V	Wolfgang Sandner	LASERLAB-EUROPE	2012-2015
19.	DE	FORSCHUNGSZENTRUM DRESDEN-ROSSENDORF EV	Ulrich Schramm	LASERLAB-EUROPE	2012-2015
20.	DE	GKSS - FORSCHUNGSZENTRUM GEESTHACHT GMBH	Sabine Roeskam Ms.	GMOS	2010-2015
21.	DE	GSI HELMHOLTZZENTRUM FUER SCHWERIONENFORSCHUNG GMBH	Thomas Uwe Kuhl	LASERLAB-EUROPE	2012-2015
22.	DE	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Ferenc Krausz	LASERLAB-EUROPE	2012-2015
23.	DE	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Marietta Winkler	GMOS	2010-2015
24.	DE	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Thomas Wagner	NOCTURNAL ATMOSPHERE	2013-2017
25.	DE	UNIVERSITAET BREMEN	Annette Ladstätter-Weißenmayer	NOCTURNAL ATMOSPHERE	2013-2017
26.	DK	AARHUS UNIVERSITET	Bente N?rlem Ms.	GMOS	2010-2015
27.	ES	Centro de Laseres Pulsados Ultracortos Ultraintensos	Luis Roso Franco	LASERLAB-EUROPE	2012-2015
28.	ES	Institut de Ciencies Fotoniques, Fundacio Privada	Dolors Mateu	LASERLAB-EUROPE	2012-2015
29.	FI	TURUN YLIOPISTO	Juha KASKINEN	IFA	2012-2015
30.	FR	ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS - ARMINES	philippe zeitoun	LASERLAB-EUROPE	2012-2015
31.	FR	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	Mikhael Bechelany	BIOSENSORS-AGRICULT	2012-2016
32.	FR	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	DIDIER NORMAND	LASERLAB-EUROPE	2012-2015
33.	FR	INSTITUT FRANCAIS DE RECHERCHE POUR L'EXPLOITATION DE LA MER	Marie-Jose Clement Ms.	GMOS	2010-2015
34.	FR	UNIVERSITE DE TECHNOLOGIE DE BELFORT MONTBELIARD	Ghislain Montavon	Refined Step	2013-2017
35.	FR	UNIVERSITE JOSEPH FOURIER GRENOBLE 1	Leslie Hollett Ms.	GMOS	2010-2015

36.	GR	FOUNDATION FOR RESEARCH AND TECHNOLOGY HELLAS	Costas Fotakis	LASERLAB-EUROPE	2012-2015
37.	GR	TECHNICAL UNIVERSITY OF CRETE	Stelios Mertikas	MELINA	2013-2017
38.	HU	SZEGEDI TUDOMANYEGYETEM	Sandor Szatmari	LASERLAB-EUROPE	2012-2015
39.	IL	INTERDISCIPLINARY CENTER FOR TECHNOLOGICAL ANALYSIS AND FORECASTING	Yair SHARAN	IFA	2012-2015
40.	IN	Institute for Ocean Management, Anna University Chennai	Ramesh Ramachandran Prof.	GMOS	2010-2015
41.	IT	CONSIGLIO NAZIONALE DELLE RICERCHE	Nicola Pirrone Prof.	GMOS	2010-2015
42.	IT	LABORATORIO EUROPEO DI SPETTROSCOPIE NON LINEARI	Roberto Righini	LASERLAB-EUROPE	2012-2015
43.	IT	POLITECNICO DI MILANO	Sandro De Silvestri	LASERLAB-EUROPE	2012-2015
44.	IT	UNIVERSITA CA' FOSCARI DI VENEZIA	Carlo Barbante Prof.	GMOS	2010-2015
45.	KE	KENYA METEOROLOGICAL DEPARTMENT	Mutai Mutai Mr.	GMOS	2010-2015
46.	LT	VILNIAUS UNIVERSITETAS	Algis P. Piskarskas	LASERLAB-EUROPE	2012-2015
47.	LT	VILNIAUS UNIVERSITETAS	Gediminas Juzeliunas	COLIMA	2011-2015
48.	NL	VERENIGING VOOR CHRISTELIJK HOGER ONDERWIJS WETENSCHAPPELIJK ONDERZOEK EN PATIENTENZORG	Johannes de Boer	LASERLAB-EUROPE	2012-2015
49.	NO	NORSK INSTITUTT FOR LUFTFORSKNING	Paal Berg Mr.	GMOS	2010-2015
50.	PL	WOJSKOWA AKADEMIA TECHNICZNA - MILITARY UNIVERSITY OF TECHNOLOGY	Henryk Fiedorowicz	LASERLAB-EUROPE	2012-2015
51.	PT	INSTITUTO SUPERIOR TECNICO	LUIS SILVA	LASERLAB-EUROPE	2012-2015
52.	RO	INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA LASERILOR PLASMEI SI RADIATIEI	Traian Dascalu	LASERLAB-EUROPE	2012-2015
53.	RO	UNITATEA EXECUTIVA PENTRU FINANTAREA INVATAMANTULUI SUPERIOR, A CERCETARII, DEZVOLTARII SI INOVARII	Luciana BRATU	IFA	2012-2015
54.	RU	CENTRAL INSTITUTE OF AVIATION MOTORS	Alexander Starik	NOCTURNAL ATMOSPHERE	2013-2017
55.	RU	Meteorological Synthesizing Centre - East of EMEP	Marina Varygina Ms.	GMOS	2010-2015
56.	RU	Saint Petersburg State University	Nikolay Mashyanov Dr.	GMOS	2010-2015
57.	RU	Saint-Petersburg State University	Nikolay Bezuglov	COLIMA	2011-2015
58.	RU	TOMSK POLYTECHNIC UNIVERSITY	Yuri Sharkeev	Refined Step	2013-2017

59.	SE	GOETEBORGS UNIVERSITET	Ludde Edgren Dr.	GMOS	2010-2015
60.	SE	IVL SVENSKA MILJOEINSTITUTET AB	Mats Ridner Mr.	GMOS	2010-2015
61.	SE	LINKOPINGS UNIVERSITET	Rositza Yakimova	BIOSENSORS-AGRICULT	2012-2016
62.	SE	LUNDS UNIVERSITET	Claes-Goran Wahlstrom	LASERLAB-EUROPE	2012-2015
63.	SI	INSTITUT JOZEF STEFAN	Darko Korbar Mr.	GMOS	2010-2015
64.	SK	MEDZINARODNE LASEROVE CENTRUM	Dusan Chorvat	LASERLAB-EUROPE	2012-2015
65.	SR	Instituut voor Toegepast Technologisch Onderzoek	Dennis Christiaan Wip Mr.	GMOS	2010-2015
66.	TW	National Taipei University of Technology	Thomas Yang	Refined Step	2013-2017
67.	UA	Institute of Fundamental Problems for High Technology of Ukrainian Academy of Sciences	Vyacheslav Kochelap	NOCTURNAL ATMOSPHERE	2013-2017
68.	UA	NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE	Starodub Nikolay	BIOSENSORS-AGRICULT	2012-2016
69.	UA	ODESSA NATIONAL I.I. MECHNIKOV UNIVERSITY	Valentyn Smyntyna	BIOSENSORS-AGRICULT	2012-2016
70.	UK	SCIENCE AND TECHNOLOGY FACILITIES COUNCIL	John Collier	LASERLAB-EUROPE	2012-2015
71.	UK	THE UNIVERSITY OF MANCHESTER	Liz FAY	IFA	2012-2015
72.	UK	THE UNIVERSITY OF MANCHESTER	Stephen HAMER	RADIONET-FP7	2009-2012
73.	UK	UNIVERSITY COLLEGE LONDON	Nora de Leeuw	Refined Step	2013-2017
74.	UK	UNIVERSITY OF STRATHCLYDE	Dino Anthony Jaroszynski	LASERLAB-EUROPE	2012-2015
75.	UK	University of Strathclyde	Dino Jaroszynski	LASERLAB-EUROPE	2009-2012
76.	UK	UNIVERSITY OF YORK	Chris Barber Mr.	GMOS	2010-2015
77.	ZA	South African Weather Service	Ernst Brunke Dr.	GMOS	2010-2015

Table 4. Not retained FP 7 project proposals

(In total 16. Above threshold 5. 14 – coordinated proposals)

Nr	Proposal title	Coordinator, Partner from Latvia	Countries Consortia partners	Duration Total in € from EU FOTONIKA-LV in €	Evaluation results
1.	Reaching new limits of accuracy for distance measurements in satellite ranging by using technology of femtosecond frequency combs. **FEMTO-SAT, 313027**, **SPA.2012.2.2-01**	Coordinator Dr.Phys. Janis Alnis FOTONIKA-LV University of Latvia	LV, DE, CZ, South Korea	2012-2014 Total 931 500 **€**	57 from 100
2.	Optical technique for diagnostics and clinical course monitoring of sepsis, O**pto-Sepsis, 318647, ICT-2011.3.5**	Coordinator Dr.Phys. Janis Spigulis FOTONIKA-LV University of Latvia	LV, LV, EE, 3xFI, RU	2012-2014 Total 1 355 600**€**	8 from 15
3.	Distant Tumour Assessment by Advanced Multispectral **Imaging, DITA, 318664**, ICT-2011.3.5	Coordinator Dr.Phys. Janis Spigulis FOTONIKA-LV University of Latvia	LV, LV, LV, LT, NL, NL, SE, SE	2012-2014 Total 931 500**€**	8 from 15
4.	A new plasma processing system with advanced characterisation for bioceramics, **PLASMA-BIOCERAMICS, 318989** , P7-PEOPLE-IRSES-2012	Coordinator Dr.Karlis Gross, RTU Dr.Phys. Arnolds Ubelis FOTONIKA-LV University of Latvia	2LV, AT, 2AU, BY,CA FR, TW, UK	2012-2016 Total: **41 700 €**	62,5 from 100
5.	Metal oxide nano heterostructures for optical biosensors. **Reg. Nr. 333942** FP7,PEOPLES-CIG 2013 Deadline 18. 09.2012	Coordinator Dr.Phys. Arnolds Ubelis FOTONIKA-LV University of Latvia Dr.Roman Viters	LV, UA	2013-2016 Total: **100 000 €**	57.10 from 100
6.	**Reg. Nr. 618486-MONA-opt** Metal oxide nano heterostruc-tures for optical biosensors FP7,PEOPLES-CIG 2013 Deadline 15. 03.2013	**Coordinator Dr.Phys. Arnolds Ubelis FOTONIKA-LV University of Latvia Dr.Roman Viters**	LV, UA	2013-2016 Total: **100 000 €**	68,40 from 100
7.	**FP7,PEOPLES-CIG 2013** reg. **Nr. 630878 – EOSMON** – Strustural, Electrical, optical and sensitive properties of metal oxide laminates. Deadline 18. 09.2013	Coordinator Dr.Phys. Arnolds Ubelis FOTONIKA-LV University of Latvia Dr.Roman Viters	LV, UA	2013-2016 Total: **100 000 €**	73,00 from 100
8.	**FP7,PEOPLES-CIG- 2013 618637 LaMEITRA**. Laser Manipulation of Electromag-netically Induced Transparency in Rydberg Atoms in the Dipole Blockade/Antiblockade Regime Deadline 18. 09.2012	**Coordinator Dr.Phys. Aigars Ekers FOTONIKA-LV University of Latvia Dr.Theodora Kirova**	LV, BG	2013-2016 Total: **100 000 €**	76.60 from 100
9.	**FP7-PEOPLE-2013-IOF**	Coordinator	LV, BG	2013-2016	81.60

	Reg. 625110, : RYDEIT Laser Manipulation of Electro-magnetically Induced Transpa-rency in Rydberg atoms in the dipole blockade/antiblockade regime. Deadline: 14. 08.2013	Dr.Phys. Aigars Ekers FOTONIKA-LV University of Latvia Dr.Theodora Kirova		Total: **150 000 €**	from 100
10.	**FP7-SPACE-2013-1, 3.1-01_CC SME, SAT-SENS – 607269.** Earth Based Sensors for Man-made Objects Navigation Solutions and Security of Space Assets	**Coordinator Dr.Phys. Janis Alnis FOTONIKA-LV University of Latvia**	2xLV,LT,TR,PL,LT		8,5 from 15
11.	Development of metal oxide nanomaterials for sensor applications. **METONANOSENS, Nr 607534 FP7-PEOPLES-ITN-2013,**	Coordinator:CSNR,FR Dr.Phys. Roman Viter FOTONIKA-LV University of Latvia	FR, FR,LV, 2NL, 3IT, DE, CH, EE	2013-2016 Total: **100 000 €**	76,20 from 100
12.	Spectroscopy of Ions Using Lasers and Synchrotron Radiation – a Global Scale Community. **IONS SPECTRA, Nr 612582 FP7-PEOPLES-IRSES-2013**, Deadline 17.01.2013	**Coordinator Dr.Phys. Uldis Berzins FOTONIKA-LV University of Latvia**	**LV, 2x**SE, BY, RU,US, MEXICo	2013-2017	56 from 100
13.	Geodynamics FP7-PEOPLES-IRSES-2013, Deadline 17.01.2013	**Coordinator Dr.Phys. Maris Ābele FOTONIKA-LV University of Latvia**	**LV, DE, CZ, RU, UA, S.Korea** BY, RU,US, MEXICo	2013-2017	56 from 100
14.	Nanostructured metal oxide optical biosensors for agriculture applications **reg. Nr. 612325, METOXNANOBIO FP7,PEOPLES-IAAP 2013** Deadline 16.01.2013	Coordinator: CNRS Dr.Phys. Roman Viter FOTONIKA-LV University of Latvia	**FR, LV, FR, NL, EE**	2013-2017	76 from 100
15.	**FP7-PEOPLE-2013-IIF : ASTEROID DUST, reg. 627858** Electrostatically-charged Asteroid Regolith: Dusty Trajectories and Mission Risks. Deadline 14. 08.2013	**Coordinator Dr.Phys. Ilgmars Eglitis FOTONIKA-LV University of Latvia Dr.Amara Graps**	LV, UA	2013-2016 Total: **100 000 €**	Ineligible
16.	**FP7,PEOPLES-CIG 2013 Reg. Nr. 631636 – SOLSYS DUST DEBRIS**. Deadline 18. 09.2013	**Coordinator Dr.Phys. Ilgmars Eglitis FOTONIKA-LV University of Latvia Dr.Amara Graps**	LV, UA	2013-2016 Total: **100 000 €**	Ineligible

ANNEX 4

The Association FOTONIKA-LV at the University of Latvia in the competition for H-2020 grants

Table 1.

Table 1. FINANCED H-2020 projects

Nr	Call	Proposal title	Coordinator, Partner from Latvia	Countries Consortia partners	Demanded from EU in EUR/ FOTONIKA-LV in-EUR	Evaluation results
1.	H2020-COMPET-10-2014 26.03. 2014	**EU SPACE AWARENESS (EUSPACE-AWE)**	Universiteit Leiden - Astronomy Department Association. FOTONIKA-LV Dr.Phys Amara Graps	2xNL, 2xBE, DR,5xUK, EL, 2xBE, 2xPT, ZA, FR, ES, LV, IT, IE, PL	2 000 000 **€** **50 000 €**	14,5 from 15 Financed
2.	H-2020 INFRAIA-1-2014-2 02.09 2014	**Advanced Research Networks) "EUROPLANET**	Coordinator : THE OPEN UNIVERSITY OBSERVATOIRE DE PARIS Association. FOTONIKA-LV Dr.Phys Amara Graps		9 945 361 **€** **73 900 €**	13,5 from 15 Financed
3.						

Table 2. Not retained H-2020 project proposals including marked for new resubmition and new submission pending for evaluation

(In total 25, 5 get marks above quality threshold, 8 project proposals were submitted in the status of coordinator, 6 pending for evaluation)

Nr.	Call	Proposal title	Coordinator, Partner from Latvia	Countries Consortia partners	Demanded from EU in EUR/ FOTONIKA-LV -in EUR	Evaluation Results and next steps
1.	H-2020 MSCA NIGHT-2014	SEP-210144002 **PHOTONICS and LASERS**	**Coordinator Dr. Phys.Janis Alnis FOTONIKA-LV University of Latvia**	10xLVG	139 946 **€** **82 881 €**	6 form 15 *Will improved and resubmited*
2.	H2020-	The European	University	4xUK, CZ,	2 988 841 **€**	12,5 from 15

	PROTEC-2014 Deadline26.03. 2014	NEO Science Network **Nr. 640222, Lowry**	of Kent Association. FOTONIKA-LV Dr.phys Amara Graps	PL, UA, FR, ES, IT, HU, SK	**71 259 €**	
3.	H2020- MSCA-ITN-2014 09.04. 2014	Development of Metaloxide Nanosensors for Sensor Applications, **METONANO-SENS Nr. 642336**	CNRS, France Association. FOTONIKA-LV Dr.phys Roman Viter	2x FR, LV, 3xIT, DE	2 815 497 **€** **223 578 €**	79.20 from 100 was resubmited and failed
4.	H-2020 ICT-2014-1 23.04. 2014	Multimodal hyperspectral-based compact system for early detection and management of diabetic ulcers. **MultiHyp**	**Coordinator:** **Association. FOTONIKA-LV Dr.phys Janis Spigulis**		500 000 **€**	7.50 from 15
5.	*H2020-MSCA-IF-2014: 15.09.2014*	***AMOClusOulu*** *" - " Molecular level physics on ionospheric nanoparticles" Dr.Phys. Arvind Saxena*	Coord.Ooolu University Dr. Arvind Saxena	LV, FI	179 396 **€**	55 from 100
6.	H2020- MSCA-ITN-ETN-2015 13.01. 2015	Development of Metaloxide Nanosensors for Sensor Applications, **METONANO-SENS Nr. 675694**	CNRS, France Association. FOTONIKA-LV Dr.phys Roman Viter	3x FR, LV, 3xIT, DE, 2xNL, FI, CH,	3 080 721 **€** **223 577 €**	88.40 from 100 *Will improved and resubmited* in 2016
7.	H-2020 ICT-2014-1 23.04. 2014	Photonic biosensors for point-of-care diagnosis of kidney disease patients **PHOTOKID, 644996**	Coordinator Linkoping University Association. FOTONIKA-LV Dr.phys Roman Viter	SE, LV, FR, 3x DE, UK, IT, PT	3 382 013 **€** **311 750 €**	7.50 from 15
8.	H-2020-MSCA-RISE 24.04. 2014	Development of novel 3D metal oxide nanostructures for biophotonic devices **645692, METOX PHOTODEV**	Coordinator University of Potsdam Association. FOTONIKA-LV Dr.phys Roman Viter		1 206 000 **€** **162 000 €**	63.40 from 100
9.	H2020-MSCA-RISE-2015 28.04. 2015	NANOBIOMED **IMAGE** ***691075***	**Coordinator: FOTONIKA-LV Dr.Phys**	LV, LT, FR, IT, TR, AT, BY	229 500 **€** **9000 €**	68 from 100 *Will be improved and*

			Roman Viter			*resubmited* in 2016
10.	*H2020-MSCA-IF-2014: 15.09.2014*	**655317 Nanoscopy-NV Proposal title:** Magnetic nanoscopy with nitrogen-vacancy (NV) centres in diamond	Coordinator University of Berkerley Dr.Phys Ilja Feschenko	LV, DE, USA	**257 880 €**	80,60 from 100 *Was improved and Resubmited in 10.09.2015 Pending for evaluation*
11.	H-2020 Widespread 1-2014 Teaming 17.09.2014	**PHOTONICS BALTICUM Nr 664662**	**Coordinator** **Association. FOTONIKA-LV Dr.Phys Janis Alnis**	LV, DE, 2x SE, FI	499 999**€** **312 499€**	9 from 15 *Will improved and Resubmited In 2016*
12.	H2020-FETOPEN- -1-2014 30.09. 2014	**664851 Proposal acronym: SLAM**	Lund University FOTONIKA-LV Dr.Phys Janis.Alnis	2xSE, LV, FR, CH, DE	2 922 532**€** **498 750€**	4.30 from 5.00 *Was improved and resubmited*
13.	H2020-FETOPEN- -1-2015 29.09. 2015	664851 Proposal acronym: SLAM	Lund University FOTONIKA-LV Dr.Phys Janis.Alnis	2xSE, LV, FR, CH, DE	2 922 532**€** 498 750**€**	4.30 from 5.00 *Was improved and resubmited*
14.	H2020-WIDESPREAD-2014-2 ERA-CHAIR **15.10. 2014**	Development of Space Sciences and Technologies at the University of Latvia **SPACE-LV, Nr.669073**	**Association. FOTONIKA-LV Dr.Phys Ilgmars Eglitis**	LV	**2 498 625 €**	6 from 15 *Will improved and Resubmited In 2017*
15.	ERA-NET RUSPLUS S&T-246	Nano-sensor for rapid detection of CO toxicity in blood of poisoned people **TOXICO-OP**	Gdansk University of Technology Association. PI FOTONIKA-LV Dr.phys Roman Viter	PL, LV, RU, FI, FR, DE, SW	575 000**€** **150 000€**	Rejected Above treshold
16.	H2020-MSCA-RISE-2015 28.04. 2015	"Development of Ion Beam Technologies and Modelling for Basic and Applied Research on Ions and	**Coordinator: FOTONIKA-LV Dr.Phys Arnolds Ubelis**	LV, SE, BY, RU, India	450 000**€** **162 000€**	69.20 from 100 *Will improved and Resubmited In 2016*

		Clusters" ***ION SPECTRA 691063***				
17.	H2020-MSCA-RISE-2015 28.04. 2015	Towards next generation of SLR instrumentation and advances in Geodynamics ***NEXT SLR*** **SEP-210276294**	Coordinator FOTONIKA-LV Dr.Phys Ilgmars Eglitis	3xLV, 2xDE, AT, UA, ET	337 500**€** 54 000**€**	69.20 from 100 *Will improved and Resubmited In 2016*
18.	H2020-TWINN-2015 07.05. 2015	Quantum Science from Nano-Space to the Universe by Photonics **692275 PHOTONICS BALTICUM**	Coordinator:FOTONIKA-LV Dr.Phys Arnolds Ubelis	LV, SE, SE, DE	999 812**€** 714 812.50**€**	12 from 15 *Will improved and Resubmited In 2017*
19.	H2020- SC5-04-2015-two-stage 21.04. 2015	Public Traffic Units as Air Pollution Fighters and Mouthpieces Directly on Streets **(PollFight, Nr 690483-1)**	Institute of Solid State Physics, University of Latvia FOTONIKA-LV Dr.Phys Janis Alnis	4x LV, 2x Serbia, 2x EL, 4xEE, BG, AT, LT	4 900 000/**€** **400 000 €**	5,7 from 15
20.	ERC-ADG-2015 ERC-ADG	Solar atmospheric radiation monitoring by advanced thin-film organic sensing Proposal Nr. 695454 acronym: SARMATOS	PI. Dr.Phys. Petro Smertenko	UA &LV	**2 000 000 €**	Pending for evaluation
21.	H2020-MSCA-IF-2015 Deadline 10.09.2015	Proposal ID **703834, Acronym: Diamond-US**	Dr.Ilja Fescenko	LV -US	**0.25 M€**	Pending for evaluation
22.	H2020-MSCA-IF-2015 Deadline 10.09.2015	Proposal ID 7**04318, Acronym: TuNa4OptoSens**	Dr.Roman Viter	LV -LT	**0.25 M€**	Pending for evaluation
23.	H2020-FETOPEN-	Proposal SEP 210294679	**Coordinator Dr.Arnolds**	LV, UA, DE, PL,	2 500 000 €	Pending for Evaluation

	2014-2015-RIA Deadline 29.09.2015	Proposal SEP 2102946 Acronym **H2FET**	**Ubelis FOTONIKA-LV**	BY	**LV-600 000 €**	
24.	H2020-FETOPEN-2014-2015-RIA Deadline 29.09.2015	Proposal SEP 210314227 Acronym **3DGRAPH**	**Coordinator Dr.Roman Viter FOTONIKA-LV**	LV, UA, DE, SE, FR	2 500 000 € **LV-920 000 €**	Pending for Evaluation
25.	H2020-FETOPEN-2014-2015-RIA Deadline 29.09.2015	Proposal SEP 210284481	PI FOTONIKA-LV, Dr. Janis Abolins	LV, LV, IT, LT, LT, UK DE,	3 500 000 € **LV-800 000 €**	Pending for evaluation

ANNEX 5

Excellence of FOTONIKA-LV project proposals in Competition for Latvian Research Council grants

Association FOTONIKA-LV submited 7 project proposals to the call deadline December 2012. Proposals were evaluated by international and national experts and received high marks. All proposals were recognized like excellent and ranked above quality treshold, See table below. In total 7 x 45 000 LVL were expected annualy for 3 years.

Unfortunatelly, despite international evaluation and large number of high quality proposals state authorities allocated very small amont of money for the finnacing of high quality proposals. As a result only projects with marks 93,3 from 100 were financed. Succes rate for this competition was 5% and project proposals comming from FOTONIKA-LV failed to be finaced

Association FOTONIKA-LV – project proposals to the call for proposals from Latvian Science Council Outcomes of international evaluation	Maximum Possible- 90 points.	Max. 75+15 Foreign+local evaluators
1. **Dr.Aigars Ekers**. Control of ionizing Rubidium atom-diatom reactions in the ultra-cold regime	84	73+11
2 **Dr.Hab. Uldis Bērziņš&Dr.Dag Hanstorp.** Experimental Studies of Negative Ions: Design of Mobile Apparatus and Experiments Using various Radiation Sources	79	67+12
3 **Dr.Jānis Alnis&Dr.Māris Ābele.** Advances in Satellite Ranging Science and Technologies, Earth Geodynamics and Breakthrough in Active Remote Sensing of Nocturnal Atmosphere	80	69+11
4. **Dr.Atis Skudra, Dr.Janis Spīgulis, Dr.Imants Bernsons, Dr.Erna Gailīte** "Advanced optical devices and methods for environmental and health monitoring"	78	65+13
6. **Dr. Arturs Barzdis** "Properties of carbon stars from low-resolution spectroscopy"	71	60+11
7. **Ilgmārs Eglītis** "Spectrophotometric studies of carbon stars and asteroids"	64	52+12

ANNEX 6

FOTONIKA-LV Project proposals for other sources of funding!!!!

The Project proposal	Partnering countries	EUR for FOTONIKA-LV
1. Contract between University of Latvia and the Ministry of Education and Science – **targeted finnacing to FOTONIKA-LV via Saeima decission**	LV	2015 **31 000 €** (financed) **Running**
2. 2014. – 2018. COST project TD1308, contribution to the icy satellites and planetary formation topics, Dr.Amara Grap *AT, BE, CH, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IE, IL, IS, IT, LT, LV, NL, NO, PL, PT, RO, RS, SE, SI, SK, UK*	90 participating countries	2014-2018 **LV-142 K€** **Running**
3. .Dr.Janis Kaminskis. Sciex (Switzerland grant) project " ***REG - Research on Earth Gravity by zenith cameras"*** Cooperation project wih European Space Agency (ESA) " EUPOS Contribution to GOCE Mission" . Id 4307.	LV-Switzerland	2015-2015, (financed) **Running**
4. MUTUAL FUNDS TAIWAN – LATVIA - LITHUANIACOOPERATION PROJECT APPLICATION Dr.Roman Viters. Flow-through immunosensors for determination of bovine leukaemia	LV, LT, TW	2016 – 2018 **3 x 22 754 €** **Evaluation pending**
5. MUTUAL FUNDS TAIWAN – LATVIA - LITHUANIACOOPERATION PROJECT APPLICATION Dr.Theodora Kirova. Flow-through immunosensors for determination of bovine leukaemia	LV, LT, TW	2016 – 2018 **3 x 22 754 €** **Evaluation pending**
6. Bilateral Cooperation Programme Latvia - France "OSMOZE" Dr.Roman Viters.	LV, FR	2016 – 2018 **Evaluation pending**
7. Osmoze Project:"Bilateral Cooperation Programme Latvia - France "OSMOZE", Dr.Teodora Kirova "	LV, FR	2016-2018 **Evaluation pending**
8. „GRAPHENEBIOCANCER" (FLAG-ERA JTC 2015 call, Coordinator: Dr. Donats ERTS).		2016-2018 **Evaluation pending**
9. NATO Science for Peace project: Bioengineered cell biosensors for detection of chemical and biological threats	UA, FR,LV	2016 -2018 0,05 M**€** **Failed to be financed**

10. **Three** small size cooperation contracts with SMEs	LV	2014 - 2015 In total 47 000 **€** **received**
11. Cooperation with SMEs from private sector There are about 15 applied research products in various Stages of technology readiness which could be developed in case of support to FOTONIKA-LV with relevant national institutional funding	LV	2015-2018 Expected turnover annually can grow from 200 000 to 1 000 000 **€**

ANNEX 7

Summary table:
Association FOTONIKA-LV in competition for project funding from various sources

The programme	Overall Success rate of the Programme	Number of Application / coordinato Status	Number of Applications above Quality threshold / coordinator status	Number of financed projects / coordinator status	Number of pending for evaluation
1. FP7	18%	26/18	14/7	9/4	0
2. HORIZON 2020	14%	27/10	6/2	2/0	5/5
3. EU Structural Funds		6/4	6/6	4/4	0
4. Latvia Research Council grants	6%	7/7	7/7/	0/0	0/0
5. COST program		1/0	1/0	1/0	
6. Trilateral Latvia, Lithuania, Taiwan programma	10%	2/2			2/2
7. Bilateral LV-FR Cooperation programme	40%	2/2			2/2
8. Bilateral LV-Switzerland program		2/0	2/0	2/0	no
9. FLAG-ERA JTC 2015 call,		1/0	1/0	no	1/0
10. NATO Science for Peace program	25%	1/0	1/0	no	no
11. Direct Grant from the Parliament		1/1	1/1	1/1	no
12. Contracts with SMEs		15/15	3/3	3/3	7/7