

Achievements and prospects: 25 years of the SPQEO journal

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Abstract. The Ukrainian journal *Semiconductor Physics, Quantum Electronics and Optoelectronics (SPQEO)* was launched in 1998 artificially combining three main areas of scientific activity inherent to the V. Lashkaryov Institute of Semiconductor Physics of the National Academy of Sciences of Ukraine, namely semiconductor physics, quantum electronics and optoelectronics. After a decade this artificial base turned into some kind of organic symbiosis, namely: (i) the main optoelectronic systems are based on semiconductor devices, for example, fiber-optic networks; (ii) semiconductor lasers dominate in a huge number of applications in quantum electronics; (iii) semiconductor physics proposes new types of LEDs with extremely high efficiency, and so on. This article is dedicated to the 25th anniversary of SPQEO. According to the Google Scholar Citation statistics, above 1680 articles cited more than 7350 times in total were published in the journal from 1998 to 2023. The statistics of references of journal articles and the scientific areas of the most cited articles are presented.

Keywords: SPQEO journal, semiconductor physics, quantum electronics, optoelectronics, biosensor.

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1. History of semiconductor physics, quantum electronics and optoelectronics journal

Ukrainian journal on semiconductor physics, quantum electronics and optoelectronics (SPQEO) was launched in 1998 artificially combining three main areas of scientific activity inherent to the V. Lashkaryov Institute of Semiconductor Physics of the National Academy of Sciences of Ukraine: semiconductor physics, quantum electronics and optoelectronics.

The idea of such a journal was proposed by V. Kochelap and supported by P. Smertenko. The first editor-in-chief was S. Svechnikov (1998-2006), followed by V. Machulin (2006-2014) and A. Belyaev (2014-presently). The policy of the SPQEO journal implies achieving the following goals. Firstly, the journal is an effective common platform for exchanging knowledge, ideas and concepts, for discussions and reflections as well as for presenting advanced achievements in the field of science, technology and their applications. Secondly, it promotes disseminating the results of young scientists and postgraduate students in the fields of

semiconductor physics, heterogeneous and low-dimensional structures, physics of microelectronic devices, linear and nonlinear solid-state optics, optoelectronics, optoelectronic devices, quantum electronics and sensors. Thirdly, it publishes interdisciplinary educational presentations and lectures that are closely related to the above mentioned areas and expand our understanding of current scientific, technological and applied trends.

After a decade this artificial base turned into some kind of organic symbiosis, namely:

- the main optoelectronic systems are based on semiconductor devices, for example, fiber-optic networks;
- semiconductor lasers dominate in a huge number of applications in quantum electronics;
- semiconductor physics proposes new areas for applications, for example, THz-devices, new types of LEDs with extremely high efficiency, and so on.

In 2017, we analyzed the main directions and trends in the scientific and technological development of the world and considered the issues of information support

by a modern scientific journal [1]. We were shown to live at the turnover of two paradigms crucial for the future of humanity, namely: the 6th technological wave [2-4] and the 4.0 industry [5, 6]. Understanding and vision of the trends of future technical and technological development should be reflected in specific "pieces of information". Scientific journals should provide readers with relevant content on the one hand and provide a place to present new ideas on the other hand. SPQEO aims to become a place for such an exchange of ideas, specific knowledge and visions of further developments and their places in the global trends of the 6th technological wave, 4.0 industry and STEM education.

As a result, in 2018 SPQEO was selected for coverage in the Clarivate Analytics products and services and started to be indexed and abstracted in the Emerging Sources Citation Index (Web of Science core collection). This fact opened a new stage of the SPQEO development.

The statistics of the SPQEO journal for the period from 1998 to 2018 provides:

- about 1 300 articles;
- more than 2 600 authors;
- over 4 650 citations;
- more than 60 foreign research institutes and universities from 53 countries, including

Algeria, Azerbaijan, Germany, France, Japan, Mexico, Morocco, Nigeria, Poland, South Korea, USA, Ukraine and Uzbekistan.

Starting with 2019 volume 22 No 1, SPQEO was accepted for coverage in the selected Elsevier product(s)

Our strategy for the next decade included theoretical consideration of new effects in low-dimensional semiconductor structures [7-10], establishment of new principles and approaches to create and study functionality of lasers and LEDs [11-18], clarification of some peculiarities in new hetero- and hybrid structures [19-21], application of sensor and photovoltaic cells [22-27], use of semiconductor, optic and quantum electronic devices in ecology, communications, renewable energetics and health care [28-37].

The journal sees its destination to help in enhancing competitiveness in our changeable global world.

2. Citation analysis of SPQEO over the period of 25 years

According to the Google Scholar Citation, the statistics of the SPQEO journal for period from 1998 to 2023 includes:

- about 1 680 articles;
- more than 3 200 authors;
- above 7 350 citations;
- more than 90 foreign research institutes and universities from 56 countries including Algeria, Armenia, Azerbaijan, Canada, Germany, Great Britain, France, India, Iran, Israel, Japan, Mexico, Morocco, Nigeria, Poland, South Korea, USA, Uzbekistan and others.

2.1 Number of citations

The number of citations is one of the important parameters for evaluating any journal. According to the Google Scholar Citation [38], the number of citations of the articles published in SPQEO currently amounts to 7360. The article by M. Soskin and co-authors is the most cited one with 100 citations [39]. The second most cited article (87 times) is by M. Maleki [40]. They are followed by the articles from the top-ten citations list [41-48] having the citation numbers in the range of 85–42. Yu. Shirshov with co-authors are the leaders by the number of articles in the top-ten citations list [43, 47, 48]. M. Soskin with co-authors has two citations [39, 45].

The most of the articles in the top-ten citations list are from the V. Lashkaryov Institute of Semiconductor Physics NAS of Ukraine [43, 44, 46-48]. The Institute of Physics NAS of Ukraine has provided three articles [39, 42, 45]. Simferopol State University, Ukraine has two citations [39, 45]. In addition to the articles from Ukraine, the top-ten citations list also includes articles from Iran [40], France [41], and Mexico [46].

2.2 Number of citations per year

In addition to the traditional number of citations, the top ten articles may be evaluated by citations per year. In this case, F. Syzov's article [49] is leading with 6.5 citations per year. The second position is occupied by the article of M. Maleki [40] with 5.44 citations per year. They are followed by the articles from the top-ten citations per year list [42] - 4.4, [50] - 4.33, [41] - 4.5, [51] - 4.0, [39] - 4.0, [52] - 3.86, [53] - 3.55, and [54] - 3.0.

The articles in the top-ten citations per year list are contributed by the authors from the V. Lashkaryov Institute of Semiconductor Physics NAS of Ukraine [49, 54] and the Institute of Physics NAS of Ukraine [39, 42]. Moreover, Simferopol State University, Ukraine [39], Taras Shevchenko National University of Kyiv [50] and Uzhgorod National University [52] have one article each in this list. In addition to the articles from Ukraine, the top-ten citations per year list includes the articles from Iran [40], France [41], Uzbekistan [51] and Nigeria [53].

3. Scientific area analysis of SPQEO over the period of 25 years

Roughly speaking, there are four main areas covered by the articles with the most references both in the general and per year citations lists:

- optical phenomena, for example, optical vortices in optical fibers [39, 45], optical spectroscopy of low-dimensional structures [50], [53];
- nanoparticles and 2D structures, for example, CdS nanoparticles [40], Pb(Zr,Ti)O₃ thin films [41], carbon nanotubes in liquid crystals 5CB [42], two-dimensional photonic crystals [44], [52], TiO₂ nanorods [55];
- sensors and their applications [43, 47, 48, 49, 54];
- light emitting and light conversion structures [46, 56, 57].

These areas are based on various semiconductor materials such as Si (flat, patterned, macroporous), SiC, CdS (nanoparticles, thin films), PZT (thin films), GaAs, AlGaAs, InGaP and InP (heterostructures), HgCdTe (detector arrays), MoS₂, MoSe₂, WS₂, WSe₂, SnSe₂, GaN, and others.

4. Conclusion

For twenty-five years, SPQEO has pursued a policy of creating a platform for new opportunities in international cooperation and collaboration. Actually, there is a collaboration between more than 56 countries, including Algeria, Armenia, Azerbaijan, Canada, Germany, Great Britain, France, India, Iran, Israel, Japan, Mexico, Morocco, Nigeria, Poland, South Korea, USA, Uzbekistan and others.

According to the Google Scholar Citation, the statistics of the SPQEO journal for the period from 1998 to 2023 includes about 1 680 articles, more than 3 200 authors and above 7 350 citations.

In the top-ten citations and top-ten citations per year lists there are articles from the research institutes and universities such as Iran University of Science & Technology, Laser Research Center (Tehran, Iran), Universite de Valenciennes ZI petite savate (Maubeuge, France), National Polytechnic Institute Mexico (Mexico), Dong Seoul College (Sungnam-city, Kyonggi-do, Korea), Tashkent State Technical University (Uzbekistan), V. Lashkaryov Institute of Semiconductor Physics NAS of Ukraine, the Institute of Physics NAS of Ukraine, Simferopol State University (Ukraine), Taras Shevchenko National University of Kyiv (Ukraine) and Uzhgorod National University (Ukraine).

The articles in the top-ten citations and the top-ten citations per year lists are based on various semiconductor materials such as Si (flat, patterned, macroporous), SiC, CdS (nanoparticles, thin films), PZT (thin films), GaAs, AlGaAs, InGaP and InP (heterostructures), HgCdTe (detector arrays), MoS₂, MoSe₂, WS₂, WSe₂, SnSe₂, GaN, and others.

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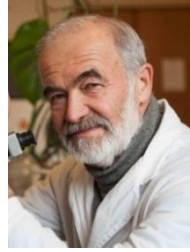


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Досягнення та перспективи: 25 років журналу SPQEO

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Анотація. Український журнал SPQEO було створено в 1998 р. як штучне поєднання трьох основних напрямів наукової діяльності, притаманних Інституту фізики напівпровідників ім. В.Є. Лашкарьова НАН України: фізики напівпровідників, квантової електроніки та оптоелектроніки. Через десятиліття ця штучна база перетворилася на певний органічний симбіоз, а саме: (i) основні оптоелектронні системи базуються на напівпровідникових приладах, наприклад, волоконно-оптичні мережі; (ii) напівпровідникові лазери домінують у величезній кількості застосувань у квантовій електроніці; (iii) фізика напівпровідників пропонує нові типи світлодіодів з надзвичайно високою ефективністю, тощо. Ця стаття присвячена 25-річчю SPQEO. Статистика статей, опублікованих у журналі з 1998 по 2023 рік, згідно з даними Google Scholar Citation, показує наступне: близько 1680 статей і більше, ніж 7360 цитувань. Наведено статистику посилань на статті журналу та наукові напрямки найбільш цитованих статей.

Ключові слова: SPQEO журнал, фізика напівпровідників, квантова електроніка, оптоелектроніка, біосенсор.