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Personality

To 90th anniversary of birthday of Professor Marat Samuilovich Soskin

Corresponding Member of the National Academy of Sciences of Ukraine, Doctor of Sciences in Physics and Mathematics, Professor, Head of the Department of Optical Quantum Electronics of the Institute of Physics of the National Academy of Sciences of Ukraine Marat Samuilovich Soskin celebrates the 90th anniversary of his birth on April 8, 2019.

Among new fascinating successes in optics in recent years, the origin of Singular Optics is related to the name of Marat Soskin, an outstanding Ukrainian scientist in the field of laser physics, optical quantum electronics, holography and singular optics.

Marat Samuilovich Soskin started his "life in science" in 1956. He entered the graduate school at the Institute of Physics under supervising of Academician A.F. Prikhotko. The subject of scientific research, which became the first one for M.S. Soskin, was associated with molecular crystals, for which the theory of molecular excitons had already appeared, but lacked experimental research. A.F. Prikhotko commissioned to him studying the spectra of naphthalene. These spectral measurements had to be carried out with exceptional precision, taking into account the hardware function of the devices. As a result, the exact forms of low-temperature absorption bands of naphthalene crystals were determined. Performed before the beginning of laser optics (1960 – 1961), these results became an important confirmation of the theory of excitons and entered into the monograph on the exciton properties of molecular crystals.

1961 became the beginning of a new stage in the development of optics, with the appearance of the first publications on quantum electronics. It became obviously necessary to develop in this direction, which realized in an attempt to create lasers with a variable wavelength of radiation. In order to work for this problem, an initiative group was formed, which in 1961 published the first article with the justification of the possibility of generating in the four-level scheme involving electron-vibrational levels. The idea of tuning the optical frequency of generation was successfully implemented in 1963 in the world's first dispersion cavity with a prism.

Further development of laser physics in the created department of optical quantum electronics, headed by M.S. Soskin since 1966, was aimed at several broad topics. From the direct laser physics, the interests went to the use of lasers for various tasks, including the so-called dynamic holography, a process where the registration and readout of holograms take place simultaneously. Also, holography became the basis for formation of a new subdivision of the Academy of Sciences of Ukraine, the International Center "Institute of Applied Optics".

Thanks to M. Soskin's authority and bright achievements, young enthusiastic disciples were attracted to the work in the department, and later they became new experienced fellows in optical researches covering physics of liquid crystals, the effects of bistability and spatial solitons, semiconductor lasers with holographic elements based on dichromatic gelatin, recording the periodic structures by using pulsed lasers, and so on.

In the 90's M.S. Soskin was interested in studies of the "optical vortices" and after his suggestion V.Yu. Bazhenov calculated and implemented (for the first time in the world) synthesized holograms, which enabled generation of laser beams with optical vortices. Then the main characteristics of optical vortices were studied, and the method for their measurement was developed, the second harmonic was obtained in interaction of a vortex beam with a nonlinear crystal, which initiated a nonlinear aspect of the problem. These first publications received over 700 citations. In the conversation with Prof. Emil Wolf in Rochester at 2000 they agreed to publish a chapter in Progress in Optics devoted to this new direction which attained the name "Singular Optics". This chapter soon became a "bestseller".

In 2000, M.S. Soskin along with M.V. Vasnetsov received the A.F. Prikhotko prize of the National Academy of Sciences of Ukraine for a series of works "Formation of dislocations of wave fronts in the passage of light through crystals". The next step was to work in the direction of polarization (vector) singular optics that extends to the present time. In collaboration with Prof. Isaak Freund, polarization singularities were studied in details.

Recognition of M.S. Soskin scientific merits resulted in a prestigious award in 2009, the prize of the International Commission on Optics and the "Galileo Galilei" medal.

Colleagues, disciples and friends of M.S. Soskin sincerely wish the jubilee a solid health, creative inspiration, happiness and new successes.

The main dates of M. S. Soskin's life

1929, April 8 – born in Kyiv.
1952 – graduated with honors Kyiv State University.
1961 – defended Candidate of Sciences dissertation.
1966 – became a Head of Department of Optical Quantum Electronics.
1969 – defended Doctor of Sciences dissertation.
1972 – awarded with the title of Professor.
1982 – along with M.S. Brodin and S.G. Odoulov, was awarded with the USSR State Prize for a series of works devoted to dynamic holography.
1991 – with the monograph "Lasers on Dynamic Gratings", along with S.G. Odoulov and A.I. Khizhniak was awarded with the K.D. Sinelnikov Prize of the National Academy of Sciences of Ukraine.
2009 – awarded with the prize of the International Commission on Optics and the "Galileo Galilei" medal.

Selected bibliography

1. V.L. Broude, V.S. Mashkevich, A.F. Prikhot'ko, N.F. Prokopuk, M.S. Soskin, On the possibility of stimulated emission in systems with electronic vibrational levels. *Fiz. Tverd. Tela*. 1062. **4**. P. 2976.
2. N.V. Kukhtarev, V.B. Markov, S.G. Odulov, M.S. Soskin and V.L. Vinetskii, Holographic storage in electrooptic crystals. *Ferroelectrics*. 1978. **22**. P. 961–964.
3. I.V. Basistiy, V.Yu. Bazhenov, M.S. Soskin, M.V. Vasnetsov. Optics of light beams with screw dislocations. *Optics communications*. 1993. **103**, No 5-6. P. 422–428.
4. N.V. Kukhtarev, V.B. Markov, S.G. Odulov, M.S. Soskin, V.L. Vinetskii. *Holographic storage in electrooptic crystals: I. Steady state. Landmark Papers on Photorefractive Nonlinear Optics*, 1995. P. 37–48.
5. M.S. Soskin, V.N. Gorshkov, M.V. Vasnetsov, J.T. Malos, N.R. Heckenberg. Topological charge and angular momentum of light beams carrying optical vortices. *Phys. Rev*. 1997. **A56**, No 5. P. 4064.
6. A.N. Alexeyev, T.A. Fadeyeva, A.V. Volyar, M.S. Soskin, Optical vortices and the flow of their angular momentum in a multimode fiber. *Semiconductor Physics, Quantum Electronics & Optoelectronics*. 1998. **1**, No 1. P. 82–89.
7. M.S. Soskin, M.V. Vasnetsov, Singular Optics, *Progress in Optics*, 2001. **42**, Chapter 4. P. 219–276.
8. O.V. Angelsky, I.I. Mokhun, A.I. Mokhun, and M.S. Soskin. Interferometric methods in diagnostics of polarization singularities. *Phys. Rev*. 2002. **E 65**. P. 036602.
9. I. Freund, A.I. Mokhun, M.S. Soskin, O.V. Angelsky, I.I. Mokhun. Stokes singularity relations. *Optics Letters*. 2002. **27**, No 7. P. 545–547.
10. M.S. Soskin, V. Denisenko, and I. Freund, Optical polarization singularities and elliptic stationary points. *Optics Letters*. 2003. **28**. P. 1475–1477.
11. G.V. Bogatiryova, M.S. Soskin. Detection and metrology of optical vortex helical wave fronts. *Semiconductor Physics, Quantum Electronics & Optoelectronics*. 2003. **6**, No 2. P. 254–258.
12. A.Y. Bekshaev, M.S. Soskin. Transverse energy flows in vectorial fields of paraxial beams with singularities. *Optics communications*. 2007. **271**, No 2. P. 332–348.
13. A. Bekshaev, K.Y. Bliokh, M.S. Soskin. Internal flows and energy circulation in light beams. *Journal of Optics*. 2011. **13**, No 5. P. 053001.
14. M.S. Soskin, S.V. Boriskina, Y. Chong, M.R. Dennis, A. Desyatnikov. Singular optics and topological photonics. *Journal of Optics*. 2016. **19**, No 1. P. 010401.
15. A.N. Samoilov, S.S. Minenko, L.N. Lisetski, M.S. Soskin, S.I. Torgova *et al*. Anomalous optical properties of photoactive cholesteric liquid crystal doped with single-walled carbon nanotubes. *Liquid Crystals*. 2018. **45**, No 2. P. 250–261.

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