

The Fifth Seminar in memory of D.N. Klyshko at the Moscow State University

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The Fifth Seminar in memory of D.N. Klyshko was held at the Moscow State University from 21 to 23 May 2007. This Seminar is held biyearly, alternating with the International Conference on Quantum Optics in Minsk, and almost all Russian researchers in the fields of quantum optics and quantum information participate in it.

As in the previous Seminars, a group of researchers from St. Petersburg was the most numerous among the non-resident participants. This group established a level of a sort which was determined by the traditionally strong St. Petersburg scientific school. The contributions presented by the group covered all the main topics of the Seminar: quantum optics and optical statistics (Yu.M. Golubev, T.Yu. Golubeva, Ya.A. Fofanov, A.I. Trubilko, N.N. Rozanov), the interaction of light with atomic ensembles (I.M. Sokolov, O.S. Mishina, D.V. Kupriyanov), and the preparation of specific quantum states for problems of quantum information (V.N. Gorbachev).

The Kazan school was represented by reports of A.A. Kalachev, A.V. Shkalikov, D.A. Kalashnikov, Yu.Z. Fattakhova, and S.V. Peterushkin. It is pleasant to note that the effect of spontaneous parametric light scattering discovered by David Nikolaevich Klyshko is utilised by the Kazan group for the development of elements for optical quantum memory and applications in spectroscopy. We are very glad that L.V. Keldysh, who was the head of the chair of quantum electronics when D.N. Klyshko worked at it, gave a lecture at the Seminar. His lecture was devoted to the problem of quantum nonlocality and recent experimental studies in this field. It is not a secret that David Nikolaevich paid great attention to the problem of interpretation of quantum mechanics, believing, however, that the ‘interpretation is a matter of taste’. L.V. Keldysh gave in his lecture the retrospective analysis of the problem of violation of the Bell inequality. The methodical aspects of the quantum theory of information and the theory of measurements were considered in the lecture of M.B. Menskii, and lively lobby discussions initiated by these two lectures refuted, in our opinion, the statement that ‘tastes differ’.

The Vladimir scientific group was represented by the lecture of A.P. Alodzhants and A.V. Prokhorov devoted to quantum calculations by using single-photon pulses in doped crystals. V.A. Mikhailov, who made a report on the interaction of two-level systems with stochastic fields, was the first representative of the Samara State Aerospace University at the Seminar.

Unfortunately, the strong Minsk school of quantum optics was represented by the only lecture of D.B. Khoroshko on individual attacks on a key in quantum cryptography. We hope that the number of participants from Minsk at the next Seminars will be greater, especially in connection with the relation between some topics studied by the Minsk and some St. Petersburg and Moscow groups. As for participants from Moscow, their group was still the most numerous, although their fraction decreases due to an increase in the number of non-resident participants. Along with the lectures given by classics L.V. Keldysh, V.B. Braginskii, and M.B. Menskii, we can point out the spectacular reports of M.V. Fedorov on the manifestation of a strong anisotropy of the entangled biphoton states upon spontaneous parametric light scattering, A.V. Masalov on the influence of a phase during light amplification in parametric processes, V.A. Andreev on the quantum tomography of spin states, F.Ya. Khalili on a comparison of the Everett and Copenhagen interpretations of quantum mechanics, and A.Ya. Okulov on the wave function of the ground state of a Bose condensate in a vortex field. Together with permanent participants – A.M. Basharov, A.V. Belinskii, Yu.I. Bogdanov, V.P. Karasev, M.V. Lebedev, S.N. Molotkov, and Yu.I. Ozhigov – O.A. Shutova made for the first time a report on the nonlinear-optical response of a medium to a superstrong field. This talk also initiated lively lobby discussion. S.V. Sazonov reported on the specific regime of excitation of a photon echo by ultrashort pulses. G.N. Goltsman presented a review on modern detectors of weak visible and IR radiation and told about new advances of his group in the development of superconducting detectors.

A new kind tradition of the Seminar is the invitation of Russian researchers working abroad. This time, our guests were N. Korol’kova, L.A. Krivitskii (graduated from the Department of Physics of the Moscow State University), V.V. Makarov, and M. Kolobov, who ‘overcame’ the language barrier and gave their talks in Russian. Although the official language of the Seminar was Russian, a report was presented in English for the first time. This possibility was presented to our friend and colleague Ling An Wu from China, which was at the Moscow University at this time. As for the young participants of the Seminar, the contributions

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of O.S. Mishin and N.V. Larionov from St. Petersburg, Yu.Z. Fattakhova, A.V. Shkalikov, A.A. Kalinkin and D.A. Kalashnikov from Kazan, and M.Yu. Saigin, G.O. Rytikov, S.P. Tarabrin, I.S. Kondrashov and I.A. Polyakov from Moscow were remembered. In addition, about twenty students and postgraduates of the Moscow State University were permanently present at sessions, who, not daring yet to ask speakers questions, actively discussed reports with each other, involving 'maestros' sitting nearby into discussions.

It is remarkable that some reports, for example, lectures of L.V. Keldysh and F.Ya. Khalili were directly stimulated by the studies of D.N. Klyshko whose ideas are still of current interest.

In conclusion, we present some figures: there were about a hundred of participants in the Seminar and 53 contributions were presented, including 17 posters; 24 reports were made by scientists from Moscow, 12 from St. Petersburg, 4 from Kazan, 3 from Chernogolovka, 2 from Vladimir and Samara, and researchers from Minsk, St. Andrew (Scotland), Turin (Italy), Lille (France), Trondheim (Norway), and Peking (China) made one report each.

Eleven papers based on reports presented in the Seminar are published in this issue of *Quantum Electronics*. We believe that these papers correctly reflect the topic and spirit of the Seminar.

We thank all the participants, both speakers and listeners. We think that the continuation of these regular seminars will be the best memory about David Nikolaevich Klyshko to whom we all greatly obliged.

The program and abstracts of the Fifth Seminar in memory of D.N. Klyshko and information on the four previous Seminars held in 2001, 2002, 2003, and 2005 is presented at the website: <http://qopt.phys.msu.su>.