

To the 90th anniversary of Eugene B. Alexandrov

On April 13, 2026 the outstanding Russian experimental physicist, Academician of the Russian Academy of Sciences, Head of the Atomic Radiospectroscopy Lab of Ioffe Physical Technical Institute and Chief Editor of „Optics and Spectroscopy“ journal from 1983 to 2021, Eugene B. Alexandrov, turns 90.

Eugene B. was born in Leningrad in 1936. After graduation from the Leningrad Polytechnic Institute in 1960 he defended the PhD (1964) and doctoral (1966) theses in the shortest time possible. This scientific career started in the Vavilov State Optical Institute, and since 1999 he has worked in Ioffe PTI.

Eugene B. is one of the scientists who determined the development of the modern quantum optics, atomic spectroscopy, laser physics and quantum electronics. His scholarly activity is distinguished by a rare combination of broad problem description and depth of experimental implementation, and his characteristic feature is a transition from research to fundamental results shaping new scientific areas.

Already in his early studies of the dynamics of cadmium atom resonance excitation E.B. Alexandrov demonstrated for the first time the phenomenon of the quantum beats of luminescence — direct illustration of the concept of superposition of the quantum states. These studies led to discovery of an entire family of effects who were called coherence resonances. The studies of this cycle have become a classic and laid the foundations for the spectroscopy of ultrahigh resolution, and brought global recognition to Eugene B.

The consistent development of these ideas manifested itself in the studies of fluctuation phenomena in the interaction of light with atomic and molecular systems. The studies of the spectroscopy of optical emission intensity fluctuations resulted in the development of the laser methods for the study of gas and liquid states. The studies in the field of radio-optical atomic spectroscopy enabled the identification of the optical self-pumping effect mechanism — spontaneous generation of deeply non-equilibrium distributions of populations by sublevels of the primary state. The studies of paramagnetic centers in transparent dielectrics developed the laser-polarimetric methods for the registration of magnetic resonance and analysis of magnetic relaxation processes.

The key achievement was the joint discovery with V.S. Zapassky in 1981 of the magnetic resonance in the noise spectrum of Faraday rotation, which kickstarted a new area — spectroscopy of spin noise, which is now globally recognized as the powerful tool for the study of quantum systems without their excitation.

Eugene B. significantly contributed to the fundamental searching experiments. In the beginning of the 1980s he set up an experiment to search for a postulated particle —



„arion“ (massless axion), which enabled the introduction of strict limitations on the existence of a new type of non-magnetic spin-spin interaction.

A special place in the scholarly activity of E.B. Alexandrov belongs to the development of precision quantum magnetometry. Already in 1960s he proposed the idea of a zero field magnetometer based on the Hanle effect, which led to many years of research in this area. He managed the design of the entire series of revolutionary circuitries of quantum magnetometers with unique metrological characteristics.

The instruments designed under his supervision have also been tested in extreme conditions. It is worthy of note that during the Arctic expedition SP-30 in 1989 Eugene B. did not limit himself to the role of the scientific supervisor only, but personally participated in the work on a drifting ice sheet for forty days, setting up the experiments and living the daily life of the expedition. This episode illustrates his characteristic principle — testing the scientific ideas not only in a laboratory, but also in the most severe natural conditions.

After the expedition Eugene B. continued development of quantum magnetometry of weak fields and suggested a few new approaches, having implemented the magne-

tometers with record-breaking characteristics of sensitivity, precision and quick response.

He also achieved important results in the fundamental issues of optics. In particular, he proposed and implemented the experiment that directly confirms the independence of the light speed on the source motion in the Kurchatov Institute. His studied dedicated to the critical analysis of so called „light suspension“ effects have also provoked wide discussion. Together with V.S. Zapassky he proposed a strict and physically transparent interpretation of the observed phenomena. It is characteristic that these studies have fully demonstrated the scientific bravery of Eugene B. — his readiness to openly and reasonably speak against common, but wrong interpretations, regardless of how popular they are.

A strong scientific school was established under the supervision of E.B. Alexandrov in Ioffe Physical Technical Institute that has held the leading positions in Russia for decades and is on the cutting edge of the global research in the field of quantum magnetometry, optical pumping and atomic radiospectroscopy. The team that he established is distinguished by superb experimental culture, inner exactingness to the results and atmosphere of scientific integrity and open discussion set by its supervisor.

E.B. Alexandrov is the author and co-author of more than 200 scientific publications and two monographs, as well as multiple popular science and journalistic papers.

Great recognition of his scientific contributions is confirmed by his election as a corresponding member of the Academy of Sciences of the USSR (1979) and a full member of RAS (1992), as well as multiple awards, such as the Award of the Academy of Sciences of the USSR named after D.S. Rozhdestvensky (1973), the USSR State Prize (1978), the International Awards of Hanle (1990) and Alexander von-Humboldt (1994), the State Prize of the Russian Federation in the field of science and technology (2020), the Gold Medal of RAS named after P.N. Lebedev (2016), the Gold Medal of RAS for the outstanding achievements in the field of propaganda of scientific knowledge in 2022. Eugene B. is awarded with the Order of the Badge of Honor (1971) and the Order of the Friendship of Peoples (1993) and multiple badges of honor. A corresponding member of the Royal Engineering Academy of Spain (2015), an honorary fellow of the London Institute of Physics (2002). The name of „Eugene“ in the honor of E.B. Alexandrov was given to an asteroid in the Solar System (2003).

A special place in the activity of Eugene B. belongs to the many years of his work as the Chief Editor of „Optics and Spectroscopy“ journal (1983–2021), where he to a large extent shaped a high scientific level and authority of the periodical, and in the 90s he took every effort to preserve it in the conditions of catastrophic lack of financing. It would not be an exaggeration to say that current „Optics and Spectroscopy“ owes its existence to Eugene B. Alexandrov.

Apart from the outstanding scientific achievements, Eugene B. possesses rare human qualities — extreme integrity

and fidelity to principle, total personal unselfishness (it would be enough to mention that Eugene B. still takes a tram or metro to travel in the city as 70 years ago) and scientific bravery. From 2012 to 2025 he headed the Commission of RAS that fought the pseudoscience and falsification of the scientific research, and from the first to the last day in this office he opposed the well-organized attempts to redirect huge amounts of public funds to finance purely falsified developments.

For those who is working and continues to work and communicate with Eugene B. he is a unique example of a true Scientist with a big "S", and his scientific and public activity is a model of serving the truth and responsibility of a scientist before the public.

The editorial office of „Optics and Spectroscopy“ journal, colleagues and students would like to congratulate Eugene B. on his anniversary and wish him strong health and further creative success.