

PERSONALIA

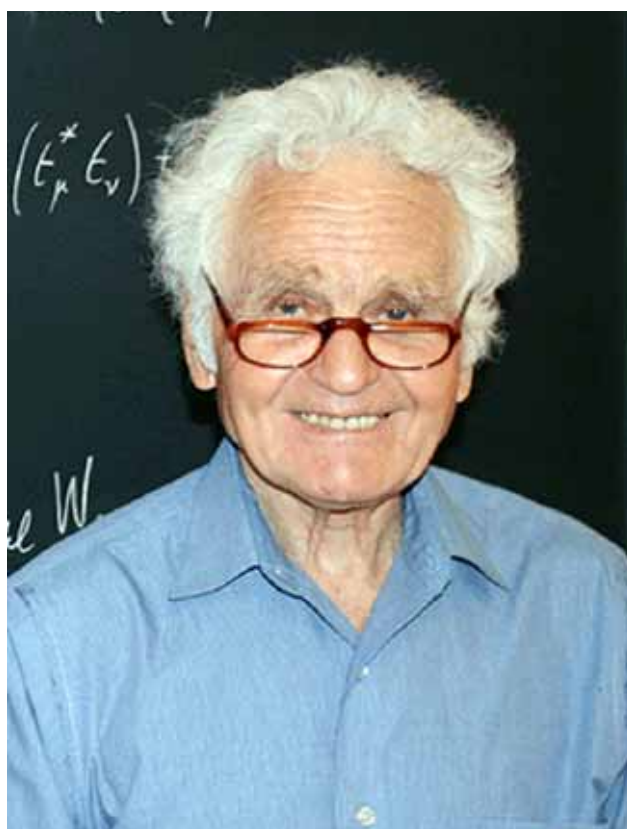
In memory of Yuri Fedorovich Orlov

PACS numbers: **01.60. + q**

With a heavy heart we received the sad news that Yuri Fedorovich Orlov, an outstanding Soviet and American physicist, died on September 27, 2020, in Ithaca, New York, USA, at the age of 96.

Yuri Fedorovich Orlov was born August 13, 1924 in Moscow. Following his childhood in a village near Moscow, he attended school in Moscow. During the war he worked at a tank factory that produced T-34, then served as an artillery officer and joined the Communist Party. After the war he worked as a fireman and graduated from high school in Moscow. Having entered the Physics-Technology Department of Moscow State University in 1947, he studied physics from V.B. Berestetsky, G.I. Budker, P.L. Kapitsa, L.D. Landau and G.S. Landsberg. After graduating from Moscow State University in 1952, he became staff of the Theoretical Department of the Institute of Theoretical and Experimental Physics (then — the Thermo-Technical Laboratory of the USSR Academy of Sciences), where he worked in 1953–1956 on the ITEP proton-synchrotron project. There he had developed the theory of nonlinear betatron oscillations using the Hamiltonian approach for the first time in this area (*Il Nuovo Cimento*, Vol. III, n. 2 (1956), p. 252).

In 1956, after a critical speech at a party meeting at ITEP, where the decisions of the 20th Congress of the CPSU were discussed, Orlov was expelled from the Party and fired from the institute. The same year, he began a 16-year collaboration with the Yerevan Physics Institute in Armenia, where he designed the Yerevan 6 GeV electron synchrotron, published articles on quantum decay and excitation of radiation, including the so-called ‘sum of decrements’ theorem, jointly with E.K. Tarasov from ITEP (*Sov. Phys. JETP* **7** (3) p. 449 (1958); *Zh. Eksp. Teor. Fiz.* **34** (3) 651 (1958); *Phys. Rev. ST-AB* **13** (2010), 024901), on spin resonances and spin depolarization, and became the head of the laboratory of electromagnetic interactions. In 1963–1964 Yuri Fedorovich, at the invitation of G.I. Budker, worked in parallel at the Institute of Nuclear Physics of the Siberian Branch of the Academy of Sciences in Novosibirsk, where he discovered, together with V.N. Bayer, the effect of quantum depolarization (*Sov. Phys. Dokl.* **10** 1145 (1965); *Dokl. Acad. Nauk SSSR* **165** (4) 783 (1965)), and in 1967 put forward the concept an electron positron collider with an energy of $100 \text{ GeV} \times 100 \text{ GeV}$, which was not realized at that time. He defended his Ph.D. thesis in Yerevan (1958) and his doctoral (Habilitation) dissertation in Novosibirsk (1963) — and received corresponding degrees, became a professor, and



Yuri Fedorovich Orlov
(13.08.1924–27.09.2020)

was elected a Corresponding Member of the Armenian Academy of Sciences (1968, expelled in 1979 due to human rights activities).

Shortly after returning to Moscow in 1972, Yuri Fedorovich joined the dissident movement, became a founding member of the Soviet section of the Amnesty International, wrote a letter to the General Secretary of the CPSU Central Committee L.I. Brezhnev in support of A.D. Sakharov and advocated glasnost and economic reforms. Despite his international reputation and authorship of over 50 scientific articles, he was fired from his research position at the Institute of Terrestrial Magnetism and Radio Wave Propagation and got support from freelance work as an author and editor of scientific filmstrips and private lessons. In May 1976, Yuri

Fedorovich founded the Moscow Helsinki Human Rights Monitoring Group and helped to create similar groups in other republics of the Soviet Union. In February 1977 he was arrested and, after 12 months of investigation, was sentenced by the court to 7 years in a strict regime camp followed by 5 years of exile for “anti-Soviet agitation and propaganda.” In 1986 Orlov was stripped of the USSR citizenship and deported to the United States.

In 1987, he resumed his scientific work at Cornell University and over the years became the author or co-author of many important scientific publications and technical reports, from an experiment to measure the anomalous magnetic moment of the muon $g-2$ to the foundations of quantum mechanics. As a visiting scientist at CERN (1988–1989), he helped develop the idea of “shaking” ion or antiproton beams to prevent accumulation of secondary particles in them, thereby doubling the amount of accumulated antiprotons (CERN-PS 89-48, 1989).

At Cornell University, Yuri Fedorovich was Senior Scientist at the Laboratory of elementary particle physics at Cornell University (1987–2008), consultant at the Brookhaven National Laboratory (1998–2009), Professor of Physics (2008–2015) and a longtime member of collaborations on the muon $g-2$ and the electric dipole moment measurements in storage rings. In addition, as a Professor of State and Law (2008–2015), he has conducted seminars on human rights. In 2015, he retired as an Honorary Professor of Physics. His memoir “Dangerous Thoughts” was published in the US (1991), Russia (3 editions), Germany, France and Ukraine. In 1993 he became Fellow of the American Academy of Arts and

Sciences, Fellow of the American Physical Society (APS) and an Honorary Member of the Academy of Sciences of the Republic of Armenia. He received several honorary degrees, such as from Uppsala University (1990), and human rights awards, including the Carter-Menil Human Rights Prize (1986), the APS Nicholson Medal (1995) and the APS Andrei Sakharov Prize (2006) from the American Physical Society. Shortly before his death, he was also delighted to learn that he had been awarded the 2021 Robert Wilson Prize from the American Physical Society.

In addition to contributing to the physics of beams and accelerators and participating in experiments to measure the fundamental constants of quantum physics, Yuri Fedorovich was deeply interested in the foundations of quantum mechanics, directly related to the philosophy and formal logic of new phenomena and the now rapidly developing field of “quantum information” (*Intl. Journ. Theor. Phys.* **21** (1) 37 (1982); *Phys. Rev. A* **66** 052324 (2002)). Everyone who knew Yuri Fedorovich got impressed by his gentleness in communication, love for life and science, his thrust to support friends and fight injustices, originality in his approaches to a wide range of problems. The warmest memories of him will forever remain in the hearts of his friends and colleagues.

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