

## Matvei Samsonovich Rabinovich (Obituary)

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Soviet science sustained a heavy loss in the untimely death on May 20, 1982 of Matvei Samsonovich Rabinovich, a prominent scientist specializing in the physics of charged-particle accelerators, plasma physics, and controlled thermonuclear fusion and an active organizer of science with an unbounded devotion to it.

Rabinovich was born at Kazan' on February 20, 1919. On graduation from the Physics Faculty of Moscow State University in 1941, he was assigned to industrial-plant work, and in January of 1945 he entered upon graduate studies in the Theoretical Section of the Physics Institute of the USSR Academy of Sciences (FIAN). He defended his Candidate's Dissertation in 1948 and his Doctorate thesis in 1954. On completion of his graduate work, he was employed in the laboratory of V. I. Veksler, who had several years earlier made reference to new possibilities for acceleration of charged particles to high energies. With Veksler and several other scientists, Rabinovich laid the foundations of a theory of circular accelerators. He also participated in the design, setup, and startup first of the 250-MeV and then of the 10-GeV accelerators at Dubna. The State (1951) and Lenin (1958) Prizes awarded for Rabinovich's work on charged-particle accelerators acknowledged its importance and wide recognition.

The Plasma Physics Laboratory was organized at the FIAN in 1960 at Rabinovich's urging, and he was its head until the end of his life. His talents not only as a physicist, but also as an organizer shone most brilliantly during those years. A whole spectrum of new trends began to develop in the laboratory under his direction and with his personal participation.

The work of Rabinovich and his staff in plasma physics and controlled thermonuclear fusion, the interaction of radiation with plasma, quantum and classical plasma electronics, and plasma theory has received the international recognition that it merits.

Rabinovich was one of the first to understand the importance and necessity of continued and more thorough study of the properties of the stellarator for the controlled-fusion program. In the face of the widespread skepticism that prevailed at the time with respect to this approach, Rabinovich embarked on a vigorous stellarator research program in his laboratory. Experiments conducted with various devices built at the FIAN won worldwide recognition, and the progress made there contributed more than a little to the rehabilitation and



MATVEĬ SAMSONOVICH  
RABINOVICH  
(1919-1982)

rebirth of the stellarator idea. Recent extensive implementation of stellarator programs in Japan, the FRG, and other countries attests to the accuracy of Rabinovich's intuition and to his skill in directing scientific research along the right path.

Rabinovich was among the first to perceive the promise of heavy-current electron accelerators for the creation of powerful pulsed centimeter- and millimeter-band microwave sources. At his suggestion, the FIAN Plasma Physics Laboratory collaborated with the Institute of Applied Physics (Gor'kiĭ) in starting the research in relativistic microwave electronics that led to the development of powerful centimeter- and millimeter-band pulsed radiation sources. These studies inspired work in the field of heavy-current electronics on a broad front in numerous laboratories, both in the Soviet Union and abroad. Rabinovich's last original paper, which was published in Doklady Akad. Nauk SSSR (Soviet Physics Doklady) in 1982, was devoted to heavy-current plasma electronics. There he reported construction of the first frequency-tunable high-efficiency plasma source of high-power coherent electromagnetic radiation.

Developing Veksler's ideas as to the radiative mechanism of charged-particle acceleration by the microwave

field, Rabinovich and his students began systematic experimental and theoretical studies of the interaction of powerful coherent microwave radiation with plasma. These investigations led to discovery of the phenomenon of anomalously strong absorption of microwaves in spatially inhomogeneous plasma near the critical density and the charged-particle production effect. A similar phenomenon was detected later on laser irradiation of plasma. Research on the interaction of high-power radiation with plasma is currently one of the broadest and most rapidly developing areas of plasma physics.

We might cite other less monumental but still pioneering initiatives: the multiphoton ionization of atoms, plasma light sources for laser pumping, laser particle acceleration, etc., for which several of Rabinovich's co-workers were honored with Diplomas of Discovery and USSR State Prizes.

Mention must also be made of Rabinovich's major community and scientific-organization effort, which was an inseparable part of the life of this exceptionally responsible, energetic, and innovative human being and scientist. The Council on the complex problem "Plasma Physics" was organized at his initiative in 1967, and he served it continuously as Chairman to the end of his days. This Council, and in no small measure Rabinovich himself, directed the scientific life of practically all laboratories and working groups in the Soviet Union concerned with plasma physics and the problem of controlled fusion. Every All-Union or International Symposium or Conference in our country has been hosted by the Council on Plasma Physics, and Rabinovich was invariably one of the prominent organizing and moderating figures. He always made an effort to inject something new and original into the work of these meetings. The annual sessions of the Council on Plasma Physics at Zvenigorod may be called "Rabinovich Lectures" with all justification, so closely were they associated with his persona. Many of the International and European Conferences on plasma physics and controlled thermonuclear fusion, the Kiev International Conference

on Plasma Theory, the Tbilisi Plasma Physics Workshop—all are linked in one way or another with Rabinovich's name. He was the spirit and organizer of most of the conferences, symposia, and workshops on plasma physics that have been held not only in the USSR, but also in other countries.

Rabinovich's work in establishing international scientific communications has been invaluable, helping to consolidate the authority of Soviet science abroad and promoting the development of friendly professional relations among scientists.

Rabinovich was a founder and the Editor-in-Chief of the journal *Fizika Plazmy* (Sov. Phys. Plasma Physics), which has been published since 1975. In a short time, this journal has grown into one of the most important journals of those published by the Academy of Sciences, and its high scientific level has won for it the international respect that it deserves. The style and working spirit of the "Fizika Plazmy" editorial staff are entirely those of Rabinovich.

Finally, Rabinovich's major involvement in pedagogical activities practically throughout his scientific career, must not go unmentioned. Most of his students are already Doctors of Science and now supervise scientific teams of their own. Rabinovich lectured to students for over 35 years, and for the last 27 was a Professor in the Theoretical Physics Department of the Moscow State Pedagogical Institute.

Everyone who was fortunate enough to live and work beside Matvei Samsonovich Rabinovich will never forget his great talent, energy, optimism, human wisdom, kindness, and genuine concern for others.

The image of talented, scholarly, and outstanding human being will long be preserved in the hearts and memories of his friends, co-workers, and students.

Translated by R. W. Bowers