

# Obituary

## Lev Andreevich Artsimovich

LEV ANDREEVICH ARTSIMOVICH, the Soviet physicist, died on March 1, 1973.

Artsimovich, the son of a professor of statistics, was born on February 25, 1909, in Moscow. At nineteen years of age he graduated from the Byelorussian State University, in Minsk, and then began work at the Leningrad Physico-Technical Institute, where he was a student of A. F. Ioffe. From 1930 onwards, he taught at a number of higher educational and research institutes in Moscow and Leningrad, including Leningrad State University and the Leningrad Polytechnic Institute. From 1930 to 1948 he worked at the Physico-Technical Institute of the Academy of Sciences of the USSR, and between 1959 and 1963 he was Academic Secretary of the Department of Physico-Mathematical Sciences of the Academy. He was elected a corresponding member of the Academy in 1946 and a full member in 1953. In 1963 he became senior associate and Deputy Head of the Institute of Atomic Energy of the Academy, and was made a member of the Editorial Board of the *Doklady* of the Academy in 1960.

Artsimovich began his research with the study of X-ray optics and the problem of total X-ray reflexion. Between 1934 and 1935 he studied properties of  $(n_1, n)$  and  $(n_1, p)$  interactions. Work which he carried out in collaboration with I. V. Kurchatov and

others was among the first demonstration of the large magnitude of slow neutron capture cross section. In 1936, together with A. I. Alikhanov and A. I. Alikhanyan, he carried out an experiment which clearly confirmed the laws of conservation in electron-positron annihilation and refuted Shenkland's postulate that in this case the basic laws were violated.

During the end of the 1930s, Artsimovich was chiefly concerned with the interaction of fast electrons with matter. Then experimental data on bremsstrahlung and the angular distribution of scattered electrons differed from the accepted theory by two orders of magnitude. In an extensive series of experiments, Artsimovich succeeded in showing that the quantum-mechanical theory of the passage of fast electrons through matter agreed with experimental data to within the limits of experimental error.

During the war, Artsimovich worked on the theory of chromatic aberrations in electron-optical systems, carrying out considerable theoretical and experimental research on electron-optical converters. In 1945, together with L. Ya. Pomeranchuk, he carried out theoretical research on radiation losses in betatrons, which enabled the maximum energy achievable by betatron acceleration to be increased. He also formed part of a team which developed an electromagnetic method of isotope separation, being himself responsible for designing the optics of the ion source.

At the beginning of the 1950s, Artsimovich began studying the possibilities of controlled thermonuclear reactions, investigating high current pulse discharges in low pressure deuterium. During these experiments Artsimovich and his team succeeded in obtaining a highly ionized plasma of  $1,000,000^\circ \text{C}$ . In 1952 they discovered that a powerful pulse discharge in low pressure deuterium is a source of neutrons and short-wave X rays. Later, they demonstrated that the gas discharge plasma, compressed in the presence of a longitudinal magnetic field, possesses paramagnetic properties. They also showed that the neutrons originate not from thermonuclear reactions but from a specific acceleration process. Artsimovich was then increasingly associated with Soviet progress in thermonuclear research, and in 1958 he presented a report on Soviet research in this field to the Second World Congress on the Peaceful Uses of Atomic Energy. During the 1960s he played a leading part in research on Tokamaks, and achieved a long-duration stable plasma with a density of up to  $10^{14}$  ions  $\text{cm}^{-3}$  and temperature of up to  $5,000,000^\circ \text{C}$ . For his work in this field, he was awarded a number of Soviet honours, including the Order of Lenin (four times), the order of the Red Banner of Labour (twice) and the Lenin Prize (1958). In 1965 he was awarded the Czechoslovak medal, and in 1966 was elected a foreign member of the Czechoslovak Academy of Sciences.

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