Lev Iosifovich Lapidus (Obituary)

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The life of L. I. Lapidus, a well-known theoretical physicist whose work had a significant effect on the development of particle physics, was cut short on May 15, 1986.

L. I. Lapidus was born on June 22, 1927 into the family of a well-known scientist, professor of political economy I. A. Lapidus

L. I. Lapidus was among the first graduates of the Moscow Institute of Engineering Physics which gave the country many talented physicists and engineers.

Immediately upon graduating from MIEP he was one of the few young theoretical physicists invited to join the staff at Dubna (Joint Institute for Nuclear Research). There, under the guidance of I. Ya. Pomeranchuk and Ya. A Smorodinskiĭ, began his research career; there he became a noted theorist whose works attracted interest at many laboratories in our country and abroad.

The research of L. I. Lapidus was distinguished by the clear physical statement of the problem; his results invariably led to direct experimental applications. Accordingly, not only was he esteemed as a theorist, but his research proved equally influential in the development of experimental research at the Dubna accelerators. Let us list several of his accomplishments that gained widespread acceptance.

In 1950 he proposed that the Vavilov-Cherenkov radiation be used for precision measurements of relativistic proton energies. Today this method is widely applied in high-energy physics.

L. I. Lapidus developed the dispersion theory of the Compton effect in protons and deuterons; he proved important theorems on the behavior of low energy Compton scattering amplitudes from particles with arbitrary spin. He was the first to demonstrate that the sign of neutron pion decay amplitude differed from the perturbation theory result. His theory of near-threshold singularities, which appear in many phenomena associated with elastic and inelastic scattering of elementary particles, proved an important contribution to elementary particle physics.

In 1962 L. I. Lapidus was awarded the degree of Doctor of Physical-Mathematical Sciences; in 1965 he was appointed to a professorship. His lectures and seminars were distinguished by the same clarity and fascination with science as his research. He was able to enthrall the audience with the elegance of physical theories and to communicate his fascination with physics.

Polarization research occupies a special place in the scientific career of L. I. Lapidus. Proceeding from a phenomenological theory of the S-matrix, he was the first to generalize the consequences of the T-invariance of polarization effects to two-particle inelastic processes. L. I. Lapidus was one of the most active participants in the theoretical development of a complete experiment in nucleon-nucleon interaction. He proposed a large number of experiments to study polarization phenomena in nucleon-nucleon collisions by using polarized proton targets. In 1966 this series of studies

LEV IOSIFOVICH
LAPIDUS
(1927–1986)

was recognized with the first prize of the Joint Institute for Nuclear Research.

L. I. Lapidus cycle of papers on the polarization phenomena in small-angle baryon scattering in the region of Coulomb-nuclear interference became known worldwide. The experiments he proposed are currently included in the research plans of a number of Soviet and foreign accelerators.

After the discovery at Serpukhov and CERN accelerators of the enhancement in full hadron interaction cross sections, L. I. Lapidus became actively involved in the development of an adequate theoretical framework—the supercritical pomeron theory. Subsequent data obtained at much higher energies corroborated the effectiveness of this approach.

A large cycle of L. I. Lapidus' papers was devoted to the quark-parton scheme of strong interactions. In these works he suggested an eigenstate method of computing the effects of inelastic screening in hadron-nucleus interactions. That method became widely known and is often used today in theoretical physics.

L. I. Lapidus' research of the recent years was devoted to quantum chromodynamic effects in reactions of hadrons

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and nuclei. In this well-established field he discovered a number of elegant effects. The permeability of the nuclear medium to compact hadron configurations—a phenomenon discovered by Lapidus—is now familiar to every specialist in the field.

In the last year of his life, despite a debilitating illness, L. I. Lapidus continued his productive work. He reurned to the subject of Vavilov-Cherenkov radiation and obtained a number of new results for its luminosity in an absorbing medium. When talking with his colleagues and students he mentioned new reseach plans and new interesting problems. Lev Iosifovich died at the height of his creative powers. Theoretical physics has suffered a great loss.

When recalling the years of scientific interplay, all of Lapidus' co-workers note that the cooperation was always interesting. He had the rare gift of attentively listening to and understanding the problems of others. This talent proved particularly useful when he served as assistant scientific director of the Nuclear Research Laboratory at the JINR, a position he occupied from 1958 until 1980. He combined politeness and tact in dealing with people, with firmness and rectitude when faced with dishonesty, whether in science or everyday life.

The fact that high-energy physics now occupies a leading place in the research of the JINR Nuclear Research Laboratory is largely a result of L. I. Lapidus' many years of effort and initiative.

L. I. Lapidus devoted much of his time and energy to the education of young scientists. Today his students work in many Soviet and foreign research centers. His seminar for young scientists continues at the Nuclear Research Laboratory.

A fond memory of Lev Iosifovich, an outstanding person and scientist, will always survive in the hearts of those who knew him.

Translated by A. Zaslavsky