Physics – Uspekhi **43** (11) 1161 – 1162 (2000)

PERSONALIA PACS number: **01.60.+q**

Veniamin Aleksandrovich Sidorov (on his seventieth birthday)

DOI: 10.1070/PU2000v043n11ABEH000880

Veniamin Aleksandrovich Sidorov, an outstanding experimental physicist, a corresponding member of the Russian Academy of Sciences, deputy director of the G I Budker Institute of Nuclear Physics of the Siberian Division of the Russian Academy of Sciences (RAS SD), head of the Joint Laboratory, winner of the Lenin and State Prizes, had his 70th birthday on October 19, 2000. V A Sidorov was born in the village Babarino of the Vladimirskaya region in a family of a worker. In 1942 his father perished in the Second World War leaving his wife, Maria Vasil'evna, with two sons, the elder being 12 years old... In 1948 V A Sidorov was accepted into the famous 'Fiztekh' (the Physico-Technical faculty of the M V Lomonosov Moscow State University).

The research activities of Veniamin Aleksandrovich began at the Laboratory of Scientific Instruments No. 2 (later transformed into the I V Kurchatov Institute of Atomic Energy, and now into the Russian Research Center "Kurchatov Institute"). V A Sidorov's unconventional gift as an experimentalist immediately manifested itself. Studying cross sections of nuclear reactions, Sidorov designed an original multichannel time-of-flight neutron spectrometer. One of the results obtained with this spectrometer was the discovery of a new quasi-stable nucleus ^{6}Be.

In 1959, on I V Kurchatov's recommendation, V A Sidorov worked for a year in the Institute of Theoretical Physics in Copenhagen (now the N Bohr Institute of Theoretical Physics). In Copenhagen and then in Moscow he worked on the properties of light nuclei and published a number of papers on the subject. Together with B V Rybakov he wrote the monograph *The Spectrometry of Fast Neutrons* based on this work; it was published in the USA and a number of other countries.

A new stage in the life of Veniamin Aleksandrovich began in 1961, after he moved to Novosibirsk. From this time on, he headed a laboratory of the Institute of Nuclear Physics (INP) of the Siberian Division of the Russian Academy of Sciences.

Veniamin Aleksandrovich Sidorov is one of the founders of the colliding beams technique. In 1964 two electron-beam colliders, the first in the world, began operating in Novosibirsk and at Stanford University in the USA. In Novosibirsk, this was the VEP-1 that reached an energy of 2×160 MeV and a luminosity of 3×10^{27} cm^{-2} s^{-1}. The collider was built as two rings about 1 meter in diameter. Note that to set up an equivalent experiment by a conventional method, an accelerator with a 100 GeV beam would be required.

For the VEP-1 experiment, V A Sidorov had a detector designed and manufactured using optical spark chambers. For the first time the luminosity was measured by employing small-angle elastic scattering. These experiments confirmed the validity of quantum electrodynamics down to distances of 6×10^{-14} cm; they studied double bremsstrahlung for the first time, and recorded the spectrum of single bremsstrahlung.

Uspekhi Fizicheskikh Nauk **170** (11) 1259 – 1260 (2000)
Translated by V I Kisin

Veniamin Aleksandrovich Sidorov

In 1965 the VEPP-2 electron-positron collider started operating in Novosibirsk. For this new machine, V A Sidorov led the design and construction of a detector based on 60 optical spark chambers. In 1967 the ρ-resonance was observed for the first time in colliding beams. For the separation of electrons and pions, V A Sidorov suggested the efficient correlation matrix technique.

In 1967 V A Sidorov and a number of colleagues from the INP received the Lenin Prize for the development of the method of colliding beams.

In 1969, after the detector and the VEPP-2 storage ring were upgraded, an experiment was run on the ϕ-meson resonance with all three basic decay modes simultaneously recorded, the two-quantum annihilation was studied, and two-photon creation of e^+e^- pairs was observed for the first time, opening the way to studying photon – photon collisions with colliding electron – positron beams.

In 1970 an experiment was run in the energy range $2E = 1.18 - 1.34$ GeV. Again for the first time in colliding beams, the experiment was conducted in the 'on-line' mode. Cherenkov counters were used for particle identification. The integrated luminosity came to 13 inverse nanobarn. A new phenomenon was discovered (simultaneously with Italian

physicists) of multiple production of hadrons; it was also discovered that the form factor of pions and kaons at energies above the ϕ-meson resonance is greater than the value predicted by the vector dominance model. All this work was also carried out under Sidorov's guidance.

At the beginning of the 1970s Veniamin Aleksandrovich proposed an experimental program for a new collider, VEPP-2M, with a luminosity two orders of magnitude greater than in its predecessor. This collider has been working for physics for more than 25 years. Several generations of detectors changed: OLYA, ND, CMD, SND, CMD-2. A dozen or so new particle decays and new processes in e^+e^- collisions were discovered. In the mass range around 1 GeV, the table of elementary particles is largely based on the results of experiments set up and guided by V A Sidorov. Among the latest results obtained by experimentalists, we can mention the discovery of scalar mesons in radiative decays. The entire set of the reported data points to an exotic 4-quark nature for scalar mesons. The cross section of the $e^+e^- \to 3\pi$ process reveals a structure related to a new resonance ω'.

Veniamin Aleksandrovich also led the design of the universal magnetic detector MD-1 for experiments on the VEPP-4 collider. The MD-1 project had a number of specific features. The magnetic field was perpendicular to the plane of the beam orbit. The magnet's coil was for the first time placed outside the calorimeter housing. The detecting system was formed of proportional chambers comprising about 0.5 mln wires and Cherenkov gas counters. From 1978 – 1985, a series of experiments was carried out on studying Υ-mesons and two-photon processes. The integrated luminosity was 30 inverse picobarn, and 100,000 Υ-mesons were recorded. High-precision measurements of Υ-, Υ'- and Υ''-meson masses were successfully conducted. Cross sections of hadron creation in photon – photon collisions and in electron – positron annihilation were measured with high precision. V A Sidorov's work on development of computing in scientific research received the Prize of the Soviet of Ministers of the USSR in 1985.

In 1989, V A Sidorov together with a group of colleagues at the INP received the State Prize for a series of papers on the precision measurements of the masses of elementary particles in colliding electron-positron beams.

In 1982 V A Sidorov and his group started work on the development of low-dose digital X-ray tomographic scanners for medical diagnostics. The ability of a doctor to rapidly process and interpret the digital image stored in the memory of a computer makes it possible to greatly enhance the diagnostic power of projective X-ray tomography. A plant in the town of Orel manufactures such set-ups according to the documentation provided by INP; production has also started at two more plants, one in Lesnoĭ of the Sverdlovsk region and one at Berdsk of the Novosibirsk region.

The significance of the achieved physical results allowed the experimentalists led by V A Sidorov to propose a new program of experiments for the new collider, VEPP-2000.

At the moment, the construction of the detector KEDR is nearing completion and experiments with this detector are starting at the VEPP-4M collider. The creation of this unique detector, which for 10 years was the job of practically all laboratories of the INP of the RAS SD under Sidorov's leadership, opens new possibilities in the physics of quarkonia and two-photon physics.

Veniamin Aleksandrovich created a new school that continues to study properties of elementary particles by colliding beam techniques. Many of his students obtained PhD and DSc degrees. The government recognized his achievement in the progress of science and in his individual research by a number of honors.

Excellent organizational abilities allowed V A Sidorov in his capacity as a deputy director of INP to carry most of the management of research programs for the entire institute. His tireless activities go far beyond the walls of the INP: for many years he was a member of several commissions and councils of the Russian Academy of Sciences.

V A Sidorov is an outstanding Russian scientist of world renown. He has published more than 250 papers on elementary particle physics and taken part in organizing a number of international conferences. He is one of the founding members of the International Conference on Instrumentation for Experiments e^+e^- at Colliders which has regularly assembled since 1977; he invariably heads the organizing Committee of this conference when it comes to Novosibirsk.

Friends, colleagues and students send their warm greetings to Veniamin Aleksandrovich on the occasion of his jubilee and wish him new achievements in physics, good health and happiness.

V E Balakin, L M Barkov, N S Dikanskiĭ,
E P Kruglyakov, G N Kulipanov, A P Onuchin,
V V Parkhomchuk, A N Skrinskiĭ, Yu A Tikhonov,
A G Khabakhpashev, I B Khriplovich and B V Chirikov