

PERSONALIA

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Aleksandr Nikolaevich Skrinsky (on his 90th birthday)

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On January 15, 2026, the outstanding physicist and academician of the Russian Academy of Sciences (RAS), Aleksandr Nikolaevich Skrinsky, scientific supervisor of the Institute of Nuclear Physics of the Siberian Branch of RAS, turned 90.

The name of A.N. Skrinsky is closely associated with many brilliant chapters in the history of the development of charged particle accelerators and high-energy physics in the country and in the world.

Under the leadership and with the direct participation of A.N. Skrinsky, setups with colliding electron-electron beams — VEP-1 (1964) — and electron-positron beams — VEPP-2 (1966) — were created. A number of pioneering experiments were conducted at these facilities to test quantum electrodynamics at short distances (1965–1967), as well as to study light vector mesons. In addition, these experiments were the first to detect multiple hadron production in electron-positron annihilation (1967–1970).

At the VEP-1 and VEPP-2 installations, A.N. Skrinsky and his colleagues conducted a series of pioneering studies of collective effects in storage rings. They were the first to discover coherent longitudinal and transverse instabilities, to investigate the mechanism of their appearance, and to suggest and implement methods for their suppression. The collision effects in cyclic accelerators were examined theoretically and experimentally. A.N. Skrinsky was the first to point out the nonlinear nature of such interactions and to demonstrate the role of nonlinear resonances and stochastic instability in restricting the luminosity of colliding-bean facilities.

In the early 1970s, under the leadership of A.N. Skrinsky and with his altogether direct participation, as well as that of G.M. Tumaikin, I.A. Koop, and E.M. Trakhtenberg, a new VEPP-2M setup was designed. For many years, it remained the most effective facility in the world in its energy range. The complexity of this installation and the art of its creators are demonstrated by the vertical size of the colliding electron and positron beams — 10 micrometers with an orbit diameter of nearly 6 meters.

The results of the studies, obtained during creation and development of the colliding beam method, are the basis of today's experimental high-energy physics examining the properties and laws of the world of elementary particles.

The line of work initiated by A.N. Skrinsky in 1966 on practical production of polarized electron and positron beams in storage rings and their use in elementary-particle and nuclear physics turned out to be quite important and fruitful. Under his supervision, the theory of spin motion in real magnetic fields of accelerators and storage rings was formulated, and methods for controlling spin motion using spin rotators and 'Siberian snakes,' as well as for obtaining longitudinally polarized beams in storage rings, in particular, for colliding beams, were proposed. The realizability of this method was proved theoretically in 1970.

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Aleksandr Nikolaevich Skrinsky

Together with Yu.M. Shatunov and other colleagues, A.N. Skrinsky developed methods for measuring the polarization of circulating beams, and the mechanism of radiation beam polarization was experimentally studied for the first time in 1970. They then proposed, developed, and implemented (the first experiments were in Novosibirsk in 1975) an original method of precision measurement of elementary particle masses using the resonance depolarization of electron-positron colliding beams. The method allowed establishing the mass scale within the range of 1 to 100 GeV$/c^2$ accurate to 3×10^{-6} (VEPP-4 experiments).

These methods found application with the electron ring of the HERA collider (Hamburg, Germany) for experiments with internal targets and, with the participation of the G.I. Budker INP, the RHIC storage ring (Brookhaven, USA) for obtaining longitudinally polarized colliding proton-antiproton beams, not to mention the NIKHEF storage ring (Netherlands) and BATES laboratory (MIT (Massachusetts Institute of Technology), USA). On the basis of technologies of the colliding beam method, the largest experimental installation in the world — the Large Hadron Collider (CERN) — was constructed.

As recognition of Aleksandr Nikolaevich's role in conducting colliding beam experiments and in the development of new methods in elementary particle physics, he was elected a corresponding member of the USSR Academy of Sciences in 1968, and already in 1970, a full member of the USSR Academy of Sciences at the age of 34!

An outstanding page in the history of the development of accelerator physics is the method of 'electron cooling' of heavy charged particle beams, proposed in 1966 by G.I. Budker. The method was initially elaborated by G.I. Budker and A.N. Skrinsky. The effect of electron cooling was for the first time experimentally confirmed in 1974 at the specially designed NAP-M setup by A.N. Skrinsky, along with N.S. Dikansky, I.N. Meshkov, R.A. Salimov, and other colleagues. And further on, after A.N. Skrinsky, Ya.S. Derbenev and V.V. Parkhomchuk cleared up the role of magnetization effects; these studies led to the discovery and theoretical description of fast electron cooling (the work by A.N. Skrinsky, N.S. Dikansky, and V.V. Parkhomchuk). Since 1978, numerous applications of the method in fairly important areas have been found. The method has been widely used in many laboratories all over the world, in many cases, with participation of the G.I. Budker INP (CERN; GSI, Germany; IMP, China).

Muon accelerators and colliders have been designed at the institute since the 1970s. A.N. Skrinsky has developed the physics of ionization cooling of muon beams and, on the basis of this method — conceptual projects of muon colliders and neutrino plants.

A new area of studies — free electron lasers (FELs) — appeared at the INP under A.N. Skrinsky's guidance and with his active personal participation. In particular, he proposed a modification of FEL, an optical klystron (1977), which made it possible to implement FELs based on electron storage rings. Optical klystrons are now operating in several laboratories, and the optical klystron of the VEPP-3 storage ring was used to obtain ultraviolet radiation with a wavelength of 0.24 micrometers (1988), which remained a 'shortwave record' for FELs for 10 years. He proposed the use of permanent magnets in undulators, necessary for FELs, organized the development of permanent-magnet undulators for FELs and synchrotron radiation sources at the G.I. Budker INP, and proposed the use of recuperation of 'waste' electron beam energy to create high-power FELs (1979).

These ideas were later realized successfully under the guidance of G.N. Kulipanov and N.A. Vinokurov for the creation of FELs on the basis of high-frequency accelerator-recuperators. The Novosibirsk FEL is now a unique source of narrow-band coherent electromagnetic radiation in a wide wavelength range from 8 to 400 micrometers. The average radiation power of the Novosibirsk FEL is much higher than the average power of analogous foreign installations. This installation has been operating for users of infrared and submillimeter radiation — physicists, chemists, biologists, and doctors — for over twenty years, allowing them to obtain new scientific results.

A.N. Skrinsky also made a great contribution to the development of applied work based on fundamental INP elaborations. This is the application of synchrotron radiation in various fields of science and technology and the use of electron-beam technologies in industry, medicine, and the chemical and food industries. It was A.N. Skrinsky together with G.N. Kulipanov who founded the Siberian Synchrotron Radiation Center and the Novosibirsk Scientific Research School with the use of synchrotron radiation. One of the results of the activity of this school is the SKIF (Siberian ring photon source) installation, now being created in Kol'tsovo Naukograd in the Novosibirsk region.

Thanks largely to the efforts of A.N. Skrinsky, a number of Russian institutes have effectively participated in major international projects, primarily in the Large Hadron Collider project in CERN (Switzerland), experiments at B-factories at the KEK Center for High-Energy Physics (Japan), and at Stanford (USA).

With the active participation of A.N. Skrinsky, high-energy physics experiments are now being successfully conducted at the VEPP-4M collider and the new VEPP-2000 collider, and a project of a new accelerator complex at the INP SB RAS (VEPP-6) based on crab waist technology is being developed in Novosibirsk.

The world's high-energy physics community is currently working on an international linear electron-positron collider for ultrahigh energies, the conceptual design of which was worked out by A.N. Skrinsky together with G.I. Budker and V.E. Balakin as far back as the 1970s.

A.N. Skrinsky is the author and co-author of over 850 scientific publications and is actively involved in training scientific personnel. His disciples include four academicians, five corresponding members of RAS, 19 doctors, and 50 candidates of sciences.

A.N. Skrinsky carries out extensive scientific and organizational work. From 1977 to 2015, he headed the G.I. Budker Institute of Nuclear Physics of the Siberian Branch of RAS. For several years, Aleksandr Nikolaevich served as academician secretary of the Nuclear Physics Division of the USSR Academy of Sciences and the Russian Academy of Sciences. Then, for many years, he served as a member of the RAS Presidium and the Presidium of SB RAS, head of the Nuclear Physics Section of the Physical Sciences Division of RAS, and from 2001 to 2004 he was a member of Presidential Council for Science and High Technologies.

A.N. Skrinsky is a laureate of the Lenin Prize (1967), the USSR State Prize (1989), two Russian Federation State Prizes (2001 and 2006), the State Prize of Novosibirsk region (2010), and the Demidov Prize (1997); he was awarded the V.I. Veksler Gold Medal of the RAS (1991) and the P.L. Kapitza Gold Medal of the RAS (2004).

In 2001, A.N. Skrinsky was awarded the Robert Wilson Prize of the American Physical Society and, in 2003, the A.P. Karpinsky Prize (Topfer Foundation, Germany). In 2015, he received a commemorative Dieter Mohl CERN medal for his achievements in and contributions to the field of beam cooling and applications.

In 1999, A.N. Skrinsky was elected a full member of the American Physical Society, and in 2000 he became a foreign member of the Royal Swedish Academy of Sciences.

He was awarded the Order of the Red Banner of Labor (1975) and the October Revolution (1982), the Order of Merit for the Fatherland, IV degree (1996), the Order for Merit for the Fatherland, III degree (2000), the Order of Merit for the Fatherland, II degree (2006), the Order of Honor (2018), and the Order of Merit for the Fatherland, I degree (2024). Academician Skrinsky's name is included in the encyclopedia *The Best People of Russia*, and he was awarded the title of "Honorary Citizen of the City of Novosibirsk."

A.N. Skrinsky has the highest international scientific authority and is a member of several Russian and international committees that determine strategy for the development of high-energy physics around the world.

We wish the hero of the day good health, a long career, fruitful work, and new scientific results.

A.E. Bondar', N.A. Vinokurov, N.S. Dikansky,
G.N. Kulipanov, E.B. Levichev, P.V. Logachev,
I.B. Logashenko, I.N. Meshkov, V.V. Parkhomchuk,
Yu.A. Tikhonov, V.S. Fadin, Yu.M. Shatunov