Physics – Uspekhi **68** (5) 532 – 533 (2025)

PERSONALIA

PACS number: **01.60.+q**

Aleksandr Evgen'evich Bondar' (on his 70th birthday)

DOI: https://doi.org/10.3367/UFNe.2025.03.039892

May 27, 2025 marks the 70th birthday of academician Aleksandr Evgen'evich Bondar', a remarkable experimental physicist, a renowned scientist in the field of elementary particle physics, and head of the laboratory at the G.I. Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Scientists (SB RAS).

All of A.E. Bondar's scientific activity has been connected with the G.I. Budker Institute of Nuclear Physics (INP) of the SB RAS, where he came in 1973 while still a student in the Physics Department of Novosibirsk State University. At the INP, he immediately got involved in work on creating the MD-1 detector. With his active participation, a system for recording scattered electrons of the MD-1 detector was created, for which a complex of proportional chambers with a record spatial resolution of about 20 μm was designed. Already at that time, Aleksandr Evgen'evich's interests went beyond elementary particle physics and touched upon other areas, primarily the physics of accelerators. Thus, he developed methods and a detector for measuring beam polarization using synchrotron radiation at the VEPP-4 facility with colliding electron-positron beams. The above-mentioned work has found an important application in a series of experiments on precision mass determination of narrow vector mesons of the Y family, i.e., bound states of b quarks. These measurements, performed at INP in the 1980s, now remain unsurpassed in precision.

In the late 1980s, after the end of MD-1 experiments, A.E. Bondar' took an active part in the design of new detectors for experiments at electron-positron INP colliders: the KEDR detector for the VEPP-4M collider and KMD-2 for experiments at the VEPP-2M collider. Aleksandr Evgen'evich was one of the leaders of the work on preparing the project of a unique system for recording scattered electrons of the KEDR detector.

At the present time, this system is installed at the VEPP-4M and is being used in experiments with the KEDR detector. From the 1990s to the 2000s, the main scientific interests of A.E. Bondar' concerned experiments with the KMD-2 detector at the INP VEPP-2M electron-positron storage ring. One of the main goals of such experiments was hadron cross section precision measurements up to 1.4 GeV, which made it possible to determine with high precision the contribution of vacuum hadron polarization to the value of the anomalous muon magnetic moment. One of the vivid results of these experiments, obtained with the determine participation of Aleksandr Evgen'evich, was the first observation of the ϕ meson decay to the $\eta'\gamma$ state. This decay had been predicted long ago theoretically but had never been observed because of a low probability and a large background from other ϕ meson decays.

Aleksandr Evgen'evich Bondar'

In 1993, a group of INP physicists under the leadership of A.E. Bondar' joined the international Belle project aimed at creating a modern multipurpose detector and carrying out experiments at the KEKB electron-positron collider (KEK, Japan) with the world's highest luminosity. The main task of these experiments was to observe CP parity violation in B meson decays. Under the guidance of Aleksandr Evgen'evich, INP physicists made a major contribution to the creation of an electromagnetic calorimeter on the basis of scintillation CsI(Tl) crystals. The construction of the calorimeter, with a total mass of about 40 tons and containing about 9000 crystals, required great effort from the INP group and was successfully completed within the scheduled time. In experiments with the Bell detector from 1999 to 2010, the electromagnetic calorimeter was one of the key subsystems of the detector ensuring observation of CP parity violation in

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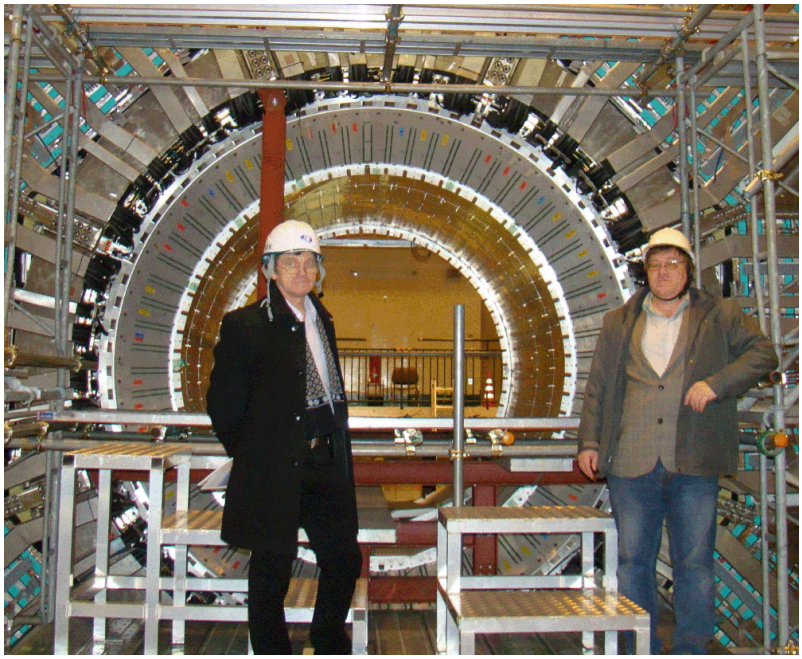
Translated by A N Tsaplin



Belle II detector assembly. A.E. Bondar' with his friend and colleague A S Kuzmin (2013).

And while on vacation, he never forgot his alma mater (Novosibirsk, Akademgorodok, May 2022).

B meson decays and high-precision measurements of the parameters of such a violation. At present, the Bell detector calorimeter is part of the new Belle II detector and used in experiments at the SuperKEKB collider. All the calorimeter channels are operable. The INP group is responsible for maintaining calorimeter operability and monitoring its performance.

After the beginning of experiments with the Belle detector, heavy quark physics took a significant place in A.E. Bondar's scientific interests. The model-independent method of determining the Cabibbo–Kobayashi–Maskawa triangle parameters, the fundamental parameters of the Standard Model, and the discovery of new exotic states of heavy bottomonium (Z_b), as well as a detailed study of their properties, are worth noting among the numerous scientific results obtained in this area by Aleksandr Evgen'evich and his colleagues. The discovery of exotic Z_b states gave impetus to the development of a new area in elementary particle physics, namely, the search for and investigation of four-quark mesons and pentaquarks.

The experience gained in the Belle experiment allowed the Novosibirsk team to seemlessly merge studies of heavy quark physics in proton-proton collisions carried out at the Large Hadron Collider (LHC) by the large international collaboration LHCb at CERN from 2009.

A.E. Bondar' is the author of more than 1450 papers in scientific journals. In 2020, he became a laureate of the P.A. Cherenkov Prize of RAS.

Aleksandr Evgen'evich is well known in the world scientific community. He is a permanent member of organizing committees of many international conferences in our country and abroad. From 1996 to 2006, he was a member of the Committee for Future Detectors (DRDC) at CERN, from 2006 to 2012, a member of the Scientific Policy Committee (SPC) at CERN, and from 2012 to 2017, a member of the International Committee for Future Accelerators (ICFA). From 2013 to 2017, Aleksandr Evgen'evich was a member of the Public Council on Science under the Ministry of Education and Science of the Russian Federation. He is a member of the editorial boards of the journals *Yadernaya Fizika* and *Uspekhi Fizicheskikh Nauk*.

Aleksandr Evgen'evich's deep knowledge of and interest in physics together with organizational skills have always attracted young scientists to him. A.E. Bondar' has been actively working at Novosibirsk State University for many years, having moved from student to dean of the Physics Department. He held this post from 2010 to 2020. At that time, the Interdisciplinary Center for Elementary Particle Physics and Astrophysics of Novosibirsk State University was organized with his active participation. On his initiative, a joint laboratory with the INP was organized to study the capability of two-phase detectors to search for dark matter particles. Aleksandr Evgen'evich has been a participant in many interesting studies carried out at this laboratory.

With all our heart, we wish Aleksandr Evgen'evich further creative success and many happy returns on his 70th birthday.

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