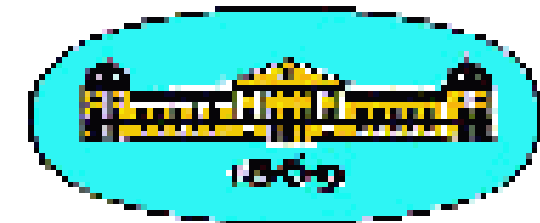




BULGARIAN ACADEMY OF SCIENCES INSTITUTE OF PHYSICS CREATOR GEORGI NADJAKOV



Introduction

Bulgarian Academy of Sciences (BAS) has a leading position in our physics during the second half of 20th century. M. Borissov [Borissov 1994] and A. Vavrek [Vavrek 1997] investigated academic history of physics during periods up to 1911 and up to the end of World War Second (1945). We will examine history of Physics at the Bulgarian Academy of Sciences from 1946 to 1972. Georgi Nadjakov as a member and vice-president of BAS created first Bulgarian institute for experimental physics research outside University (1946). A new research line introduced by him is subject of this paper. BAS Institute of Physics created many laboratories (solid-state physics, nuclear physics, technical physics, physical chemistry, meteorology and geophysics). The important role of theoretical physics laboratory headed by Assen Datzev and first members Rashko Zaykov and Nikola Kalitzin for applied research projects is the aims of this paper. Our physicists made small changes in their family name after 1945.

BAS 1856 - 1911

Meteorology and experimental physics are areas of physics created in Bulgaria in the beginning. Many physicists took part in Bulgarian Academy of Sciences creation. Demetrius Mutieff (04.09.1818–13.01.1864) is philosophy doctor from the University of Berlin in the area of theoretical meteorology (1842). He was editor of scientific magazine “Bulgarian Books” published by the Municipality of Bulgarian Literature in Istanbul (1857–1858). First attempt for registration of the Bulgarian scientific society failed because Turkish Government did not recognize the Municipality of Bulgarian Literature officially [Kamischeva 2013]. Ivan Guzelev (24.06.1844–06.10.1916) was a physicist from the University of Odessa. He became foundation member of Bulgarian Literary Society, registered in Braila (1869; corr. 1875; acad. 1884). Meteorologist Spas Vatzov (acad. 1881) and Sofia University Professor Porphyry Bachmejev (corr. 1898; acad. 1900) are members of the Bulgarian Literary Society before 1911.

BAS 1911 - 1945

Physical chemistry and analytical mechanics are next areas of physics in BAS during the period 1911–1945. The society renamed to Bulgarian Academy of Sciences since 1911. Alexandar Christoff (20.03.1872–18.10.1951) is philosophy doctor on physical chemistry from the University of Leipzig (1896). He became Sofia University professor of experimental physics (1909–1937), and corresponding member of Bulgarian Academy of Sciences (1921). Ivan Tzenov (02.01.1883–19.09.1967) was Sofia University professor of analytical mechanics (1914–1958) and member of BAS (corr. 1925; acad. 1929).

BAS 1946 - 1972

Nuclear physics, solid-state physics, astronomy, spectroscopy, technical physics, metallurgy, mathematical physics, and theoretical physics are new areas of physics developed in BAS after the World War Second. Changes gave possibility Bulgarian Academy of Sciences to create experimental scientific complex of physics. Many physicists became members of BAS. Georgi Nadjakov was experimental physicist, acad. 1945, BAS vice-president 1947–1959. Lubomir Krastanov was meteorologist, corr. 1947, acad. 1961, and BAS president 1962–1968. Kyrill Popov was mathematical physicist, acad. 1947. Rostislav Kaischew was physical chemist, corr. 1947, acad. 1961, and BAS vice-president 1962–1968. Nicola Bonev was astronomer, corr. 1948, acad. 1977. Emil Djakov was technical physicist, corr. 1948, acad. 1967. Assen Datzev was theoretical physicist, corr. 1952, acad. 1961. Christo Y. Christov was nuclear theoretical physicist, corr. 1952, acad. 1961. Angel Balevsky was metallurgist corr. 1952, acad. 1967, BAS president 1968–1988. Milko Borissov was solid-state physicist corr. 1967, acad. 1984. Ivan Todorov was nuclear theoretical physicist corr. 1967, acad. 1974. Georgi Bliznakov was physical chemist corr. 1967, acad. 1979, and BAS vice-president 1975–1977; 1982–1988. They build new institutes and laboratories of physics.

[1946–1972] Biography

Georgi Stefanov Nadjakov (26.12.1896–24.02.1981) is famous Bulgarian physicist. He was associate professor in the chair of technical physics (1927), and professor of experimental physics (1937–1963). Professor Nadjakov was the Faculty of Physics and Mathematics dean (1939–1940; 1944–1947) and Sofia University rector (1947–1951). Photo electrets (a new kind of electrets, formed by light and electricity) are state of matter discovered by him in 1937 [Nadjakov 1937a, 1938]. Together with Razum Andrejchin, they found contact-potential photovoltaic effect in 1937 too [Nadjakov 1937b].

Georgi Nadjakov had leading position in physics at the Bulgarian Academy of Sciences during the second half of 20th century. He was director of BAS Institute of Physics (05.05.1946–26.12.1971) almost all time of its existence [Vavrek 1996]. BAS Institute of physics existed up to the end of 1972 [Petrov 2014]. A new research line introduced by him has important significance for Bulgarian industry.

Georgi Nadjakov proposed, and realized Bulgarian nuclear program. The program started with three nuclear research laboratories. They are cosmic ray station (1954 headed by Leon Mitrany), radioactive ecological laboratory (1955 headed by Elisabeth Kara-Michailova), and experimental reactor (1959). Nuclear power station has built in Kozloduy on the end of this program (1968). BAS Institute for nuclear research and nuclear energy has separated since 1973.

Georgi Nadjakov (BAS Institute of Physics director) realized important role of theoretical physics laboratory headed by Assen Datzev for applied research projects. First members of theoretical physics laboratory from 1953 to 1955 are Rashko Zaykov and Nikola Kalitzin.

During the period 1952–1972, Assen Borissov Datzev (14.02.1911–12.02.1994) created theoretical physics laboratory at the BAS Institute of physics. He studied theoretical physics course of Professor Georgi Maneff at the Sofia University (1929–1933) and was PhD student in Paris (1934–1938) obtaining doctor degree. He was assistant professor of physics (1939–1944), associate professor (1947–1950) and professor (1951) at the Sofia University. He took up a professorship desk (1955–1984). He was dean of the Faculty of Physics and Mathematics (1950–1955) [Zamfirov 2012].

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During the second half of 20th century, Bulgarian physicists worked in favourable but very difficult conditions. They were overloaded to do so many things – to be movers and managers, to do setup and build technics for it, to investigate new scientific ideas and published results.

BAS Institute of Physics established six divisions from 1946 to 1953 (general physics, physical chemistry, technical physics, astronomy, geophysics and meteorology). Four of them grew up independent institutes (physical chemistry, technical physics, astronomy, geophysics and meteorology). The next laboratories created during the period 1953 – 1959 are nuclear physics, theoretical physics, optics and spectroscopy.

New laboratories created from 1959 to 1972 in areas of low temperature physics (1959), microelectronics (1959), and lasers (1964) achieved significant scientific results, new methods and self-made scientific apparatuses.

BAS Institute of physics organized Laboratory of low temperature as a technical unit of the Atomic research experimental reactor in the beginning (1959). It became research group in 1961, and research laboratory in 1963. Many self-made apparatuses as cryostat for investigation of heat transport and mechanical deformations in nitrogen temperatures (1968); electromagnets (1968); cryopump for obtaining vacuum up to 10-7 Torr (1969); solenoid with nitrogen cooling maximum field up to 25 kG (1969); model of neon liquefier (25 International Fair in Plovdiv, 1969); liquid helium installation (1972); liquid neon installation (1972) have built. Eugenie Iliev Leyarovski (05.07.1933–23.04.1999) patented new adsorption methods and apparatuses for cryogenic separation of gas mixtures from the air in Bulgaria (Patents No 10549 from 25 May 1964, and Patent No 5548 / 2 July 1965) and USA [Kamischeva 2012].

Jordan Dimitrov Kasabov (16.08.1928–13.04.1992) created microelectronics laboratory named Silicon at the beginning (1959–1966). In the area of integral electronics, he developed technology for solar panels, MOS transistors, micro resistors, and electronic calculators. He became corresponding member of BAS (1976).

Paraskeva Dimitrova Simova (06.01.1920–2010) created laboratory of optics and spectroscopy in BAS Institute of Physics (1951). In areas of spectroscopy, she investigated spectrum of liquid crystal compounds, electro-optical memory and phase transitions in liquid crystals. She initiated research in nonlinear optics (lasers).

Vasil Stefanov Vasilev (21.01.1930–04.06.2014) build first Bulgarian laser in the BAS Institute of Electronics (1964). Nikola Vasilev Sabotinov put into operation metal vapour laser (1970) in the BAS Institute of Physics (1970). Later on, he found a strong effect of hydrogen in lasers. He initiated copper bromide vapour lasers and created laboratory. He became member (2003), vice-president (1996–2008), and president (2008–2012) of BAS.

Rashko Gavrilo Zaykov (10.12.1901–25.11.1982) was first associate professor in the theoretical physics laboratory of the BAS Institute of Physics (04.12.1953–01.09.1961). As a mathematical genius, he used his talent to do theoretical and applied research in physics [Zaykov 1980].

Although studying one professional school and two prestigious universities abroad Rashko Zaykov graduated secondary school (1921) and university in Sofia (1928). He spoke seven languages: German and English good; French and Russian on average level; Turkish, Greek and Italian slightly.

His work on theory of relativity marks beginning of this field in Bulgaria (1925–1935). Personal friendships with Einstein during the first half of 20 Century and with Nadjakov in the second half of 20th Century have very important role for his success in science.

Rashko Zaykov made applied theoretical research in Bulgaria and Germany (1936–1953). At the Sofia University Institute for economic research (01.01.1935–22.02.1940), he has significant contribution in the area of mathematical statistics for creation variation differences method. After the World War Second, Rashko Zaykov worked in Bulgarian State Insurance Institute (12.12.1946–02.12.1953) economic management surveying section as an advisor instructor first category [BAS Archive, Fund 1c, sheet 97].

Rashko Zaykov worked in Siemen's factories two times (1933–1935, and 1942–1944). During the second of this period as a mathematician, “he contributed to creation of important nuclear apparatus – betatron [accelerator] in Germany” [BAS Archive, Fund 1c, sheet 90]. It became reason for his future work in the area of nuclear physics.

Nikola Stiliyanov Kalitzin (01.12.1918–10.08.1970) graduated High Technical School in Berlin (1943) and mathematics from the Sofia University (1947). He was associate professor (1948–1953) and professor on the theoretical mechanics (1953–1955) in Varna. Georgi Nadjakov appointed him associate professor (1955–1961) and professor (1961–1970) in the Theoretical laboratory of BAS Institute of Physics. Nikola Kalitzin was a PhD student at the Russian Academy of Sciences (1962) and became D.Sc. at the Moscow State University (1963). He has theoretical physics specialization in Dubna (1964). His results are in theory of elementary particles and nuclear physics [Kalitzin 1953], theory of relativity [Kalitzin 1975] and theory of shuttles [Kalitzin 1960].

During the period 1955–1963, Christo Yankov Christov (12.06.1915–20.03.1990), Vasil Christov (02.10.1922–05.08.1999), and Ivan Todorov worked in the theoretical laboratory of BAS Institute of Physics. In 1958, Rashko Zaykov, Vasil Christov, and Ivan Todorov specialized in Dubna (Russia). They worked on quantum field theory, theory of elemental particles, and nuclear theory at the Russian Joint Institute for Nuclear Research. Rashko Zaykov went in pension (1972), but worked in the BAS Institute for Nuclear Research and Nuclear Energy during the next two years.

Institute of Physics established annual scientific magazine (Izvestia) in Bulgarian language (1950–1974). It was renamed Bulgarian Journal of Physics published in English language after that.