

Gennadii Nikolaevich Kulipanov (on his 80th birthday)

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January 25, 2022 was the 80th birthday of the research supervisor of the scientific area Synchrotron radiation (SR) at the Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences (SB RAS) and director of the Siberian Center of Synchrotron and Terahertz Radiation, academician Gennadii Nikolaevich Kulipanov.

Gennadii Nikolaevich was born on January 25, 1942 in the town of Shchuchinsk in the Kokchetav region of Kazakh SSR. In 1963, he graduated from the Novosibirsk Electro-technical Institute (now Novosibirsk State Technical University). Since 1963, he has been working at the Budker Institute of Nuclear Physics (BINP) SB RAS. He was elected a corresponding member of RAS in 1997 and a full member in 2003.

G N Kulipanov's main studies have been dealing with the physics of nonlinear oscillations of particles in colliders, the generation and application of synchrotron radiation, and the creation of free-electron lasers.

While working at the electron–electron collider VEP-1, Gennadii Nikolaevich studied experimentally, for the first time in the world, nonlinear resonances and stochastic instability of nonlinear oscillations at a cyclic accelerator to confirm the results of some theoretical predictions. Later on, guiding the start-up of the VEPP-3 electron–positron collider, Kulipanov continued investigating the nonlinear beam dynamics and simultaneously taught students, postgraduates, and trainees, who then became leading research fellows at BINP. The knowledge of particle dynamics gained in the colliders was then used by G N Kulipanov and his school to design high-radiance (low electron beam emittance) synchrotron radiation sources.

By the mid-1970s, it had become clear that electron colliders, in particular, VEPP-3, can be used not only for high-energy physics but also to generate high-power synchrotron radiation with record-high spectral radiance. Gennadii Nikolaevich took an active part in working out the method of evacuation of synchrotron radiation from an accumulator vacuum chamber for a further employment of this radiation in applied experiments. Gennadii Nikolaevich advocated actively the unique properties of synchrotron radiation among members of the physical, chemical, and biological scientific communities. The widely known review, “Utilization of synchrotron radiation: current status and prospects,” published in the journal *Uspekhi Fizicheskikh Nauk* [UFN 122 369 (1977); *Phys. Usp.* 20 559–586 (1977)] and written together with A N Skrinskii, became a handbook for many scientists using synchrotron radiation in their studies. Gennadii Nikolaevich was an organizer and chairman of the All-Union Council in Novosibirsk on synchrotron radiation



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physics. Since the mid-1980s, this council has become a regularly held international conference on synchrotron radiation physics, which has in fact become the leader of the new area in Russian and world science.

At the Russian research center Kurchatov Institute, G N Kulipanov and his colleagues designed and started up a specialized X-ray radiation source, Sibir'-2 (now referred to as KISI-Kurchatov), with an electron energy of 2.5 GeV, which is now the only one in Russia. Under his guidance, a superconducting multipole wiggler, a constant-magnet undulator with a variable operating gap and a hybrid (i.e., with iron poles) constant-magnet undulator were tested and exploited in experiments at the VEPP-3 storage ring for the first time in the world. These original constructions are now being used in dozens of facilities.

G N Kulipanov and his colleagues proposed and implemented schemes for staging some experiments using specific features of synchrotron radiation, and elaborated and designed experimental equipment adequate for a radiation source, which made it possible to establish the Siberian Center of Synchrotron Radiation on the basis of electron–positron



Gennadii Nikolaevich Kulipanov and Aleksandr Nikolaevich Skrinskii at a round table at BINP SB RAS.

colliders of INP SB RAS. Headed by Kulipanov, this center has been working for over 40 years. During this time, users of radiation source—chemists, physicians, and biologists—have obtained numerous important scientific results.

G N Kulipanov and his co-authors proposed a new conception of an SR source based on an accelerator-recirculator with energy recuperation. Under his scientific guidance, his disciples successfully realized several international projects on designing and creating wigglers for American, German, Japanese, and other laboratories.

G N Kulipanov and his colleagues implemented the first free-electron laser (FEL) in the world operating in the ultraviolet wavelength range. The unique Novosibirsk FEL scientific facility included in the Research Equipment Sharing Center, Siberian Center of Synchrotron and Terahertz Radiation, was designed under his guidance. The facility includes three FELs generating radiation with a record mean power in the wavelength range from 8 to 340 microns. For almost 20 years it has allowed researchers from different areas of science to obtain unique results.

A result of Gennadii Nikolaevich's research work was the elaboration and beginning of implementation of a plan for a fourth-generation synchrotron radiation source, SKIF (Synchrotron Radiation Facility—Siberian Circular Photon Source “SKIF” Boreskov Institute of Catalysis of Siberian Branch of the Russian Academy of Sciences), being constructed in Novosibirsk. Possessing an ultralow emittance of 75 pm at a beam energy of 3 GeV, SKIF will allow unique experiments with synchrotron radiation to be performed in a broad spectrum of disciplines.

G N Kulipanov is a professor at Novosibirsk State Technical University, and he is a member of the editorial boards of Russian and international journals. He is member of the Academic Council of the Joint Institute for Nuclear Research (JINR, Dubna) and a member of the Skolkovo Scientific Advisory Council.

Gennadii Nikolaevich Kulipanov was awarded the medal of the Order of Merit for the Fatherland, 2nd degree (1999), the Order of Honor (2007), and the Order of Friendship (2014). He is a laureate of the 2007 RF Government Prize and the 2003 RAS V I Veksler Prize. G N Kulipanov was conferred the rank of RIKEN Distinguished Scientist (Japan).

Colleagues and disciples of Gennadii Nikolaevich appreciate his sincere optimism that has supported the staff

of the Budker Institute of Nuclear Physics for many years. On behalf of his colleagues, disciples, and friends, we heartily wish Gennadii Nikolaevich and his family creative longevity, new scientific achievements, strong health, success, and well-being.

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