Lev Barkov – from submarines to snakes

Lev Barkov, one of the leading physicists of the Budker Institute in Novosibirsk, celebrates his 75th birthday in October.

Barkov’s early interests were related to measuring the energy spectra of fission neutrons, as part of a highly classified project to construct uranium–water nuclear reactors for atomic power stations, submarines and icebreakers. When, in 1955, this became de-classified, Barkov reported the work at the first conference on peaceful applications of atomic energy in Geneva. In 1952 he began participating in high-energy physics experiments at the Dubna synchrocyclotron, where he suggested and developed the technology for making diffraction grids on photoemulsion plates – a simple, reliable and very cheap solution, which was characteristic of his style in general.

A new period of activity began in 1967 when Barkov moved to the Institute of Nuclear Physics in Novosibirsk, where he continued studies of hyperons. He was one of those who actively backed the construction of the electron–positron collider VEPP-2M, and for experiments at this collider he suggested a unique detector with a magnetic field created by a superconducting solenoid and an optical spark chamber working at cryogenic temperatures and high pressure. The detector was successfully constructed by his young team, and the institute acquired invaluable experience of operations with liquid helium and in constructing large superconducting devices, which were used later while making the famous Siberian “snakes” – undulators and solenoids.

In the 1970s, together with Max Zolotorev, Barkov performed an experiment in which the rotation of the light polarization plane in vapours of atomic bismuth was discovered. This phenomenon indicated the weak interactions of electrons with nucleons caused by neutral currents, and the observation became one of the milestones of the Standard Model. Barkov was also the leader of the team constructing a new general-purpose detector, CMD-2, which combined many modern subsystems. This detector, installed at VEPP-2M in 1991, was successfully used until 2000 to study the properties of vector mesons. The upgrade of the VEPP-2M, to VEPP-2000, is now in progress, and will allow a study of the broader energy range with higher luminosity. A new detector, CMD-3, is also being constructed for experiments at VEPP-2000 by Barkov’s pupils, who were fortunate to hear his lectures and work together with an enthusiastic teacher.

A seminar dedicated to the 75th anniversary of Lev Barkov will be held in Novosibirsk, Russia, on 23–24 October 2003. For further information, see http://cmd.inp.nsk.su/conf/barkov2003.