

Venedikt P. Dzhelepov - 85

Dmitri V. Shirkov - 70

are irradiated. The evolution of their resistances is measured on line and compared to accurate temperature references provided by vapour pressure bulbs in the range of 1.8 to 4.2K. Moreover, different temperature and annealing cycles are performed to study the influence of the operating cryogenic conditions.

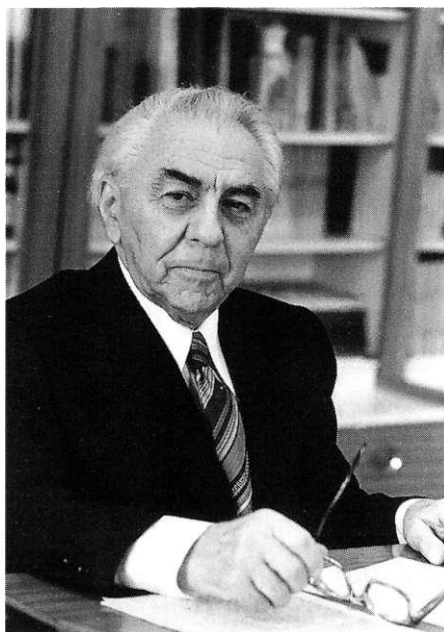
The resistance evolution of a typical sensor as a function of the neutron fluence is presented in Figure 2. These experiments showed that each sensor family, when irradiated, evolves with a typical behaviour. Based on these results and the data to come in 1998, a comparative study will select the final temperature probes for the LHC superconducting coils and cryogenic equipment.

Since SARA will cease activities this year, the extension of this programme for the years 1999-2000 at another site in western Europe is presently under examination. For tests of liquid argon calorimeter components, a second site will soon be operational in Russia at Dubna by the IBR-2 reactor. With fluxes which may attain  $10^{16}$  neutrons per sq cm in a few days of exposure, this offers the possibility of tackling the question of a pollution in the ATLAS endcap calorimeters (in particular in the very forward section) where expected radiation levels may be a hundred times higher than in the central barrel section.

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## DUBNA Honours

The Joint Institute for Nuclear Research (JINR), Dubna, near Moscow, is honouring two of its distinguished senior scientists.



On 12 April Venedikt P. Dzhelepov celebrates his 85th birthday. Among the major founders of the Institute of Nuclear Problems of the USSR Academy of Sciences (1949) and later of JINR (1956), he was Director of JINR's Laboratory of Nuclear Problems from 1956-88 and has been its honorary director since 1989.

Before coming to Dubna, he was involved in uranium work at I.V. Kurchatov's institute. Milestones in his scientific career of more than 60 years include the construction of the then (1949) world's largest 680 MeV proton synchrocyclotron, later (1984) upgraded to a high-current phasotron with a spirally varying magnetic field allowing a 20-fold increase of extracted 680 MeV proton intensity.

His experimental researches of nucleon-nucleon and pion-nucleon interactions, nuclear capture of negative muons by protons in gaseous hydrogen, negative pion electron decay, pion production of normal and strange neutral particles,



hypercharge-exchange reactions and other processes at the accelerators of JINR and IHEP (Protvino) together made a substantial contribution to particle and nuclear physics.

V.P. Dzhelepov is also known for his work on high-current accelerator complexes in the range 0.8 - 1.5 GeV based on isochronous cyclotrons. It was under his supervision that Russia's first clinico-physical complex was constructed at the synchrocyclotron of the Laboratory of Nuclear Problems for proton treatment of cancer and for radiobiological investigations for space medicine.

He is a corresponding member of the Russian Academy of Sciences, for many decades one of the leaders of the Nuclear Physics Division of the Russian Academy of Sciences, and a winner of the State Prizes of Russia and of the I.V.Kurchatov Gold Medal of the Russian Academy of Sciences. As a member of IUPAP commissions, ICFA, and editorial boards of highly authoritative scien-

tific journals he has made a substantial contribution to development of international scientific cooperation.

3 March marked the 70th birthday of Dmitri V. Shirkov. The first years of his scientific career were devoted to nuclear reactors, neutron diffusion and moderation. In the mid 50s he began working with N.N. Bogoliubov in quantum field theory, making a fundamental contribution to the axiomatic formulation of perturbation theory for the scattering matrix and to the establishment of the renormalization group. These results became a part of their famous monograph "Introduction to the Theory of Quantized Fields" first published in 1957 and later translated into English and French.

In the late 50s D.V. Shirkov suggested a method of taking the Coulomb effect into account in the microscopic theory of superconductivity. In 1960 he moved to Novosibirsk to found the Theoretical Physics Department of the Mathematical Institute and the chair of Theoretical Physics at Novosibirsk University. He and his colleagues elaborated dispersion theories of strong interactions at low energy. In 1970/71 he lectured at Lund as Nobel guest professor.

He returned to JINR in 1971 and continued his research into the application of the renormalization group and formulated the hypothesis of finite renormalization. He initiated a well-known series of Dubna papers on multi-loop calculations in QCD and elaborated the method of sum-

ming the asymptotic series which was effectively used in critical phenomena.

He also developed general methods for renormalization group transformations in various fields of physics and introduced a notion of functional self-similarity generalizing the scaling laws. From 1993-97 he was Director of the Bogoliubov Laboratory of Theoretical Physics.

He devoted much effort to the training of young scientists, for more than a quarter of a century teaching first at Novosibirsk and then Moscow State University. He is a member of the Russian Academy of Sciences, the Physiographic Society of Lund (Sweden) and the Saxon Academy of Science in Leipzig (Germany).

## Physics monitor

### The physics window at LEP

Over the next two years or so, CERN's LEP electron-positron collider will take data at energies up to about 10% larger than those achieved so far, and take several times more data than the currently accumulated amounts at energies above the Z. While those increases may seem to be opening the window onto new physics only a little, our present understanding of the physics opportunities suggests it is a window with a great view.

How can we judge the value of small increases in energy or luminosity (the luminosity is a measure of the number of collisions per second)? To make a discovery from an increase in energy it is necessary that the new particle(s) or interaction(s) occur just in the small region of the increase. Similarly, there is a luminosity threshold where one goes from too few events to be seen to a possible observable signal.

One way to judge whether we are entering such a region is to take a model of the new physics that incorporates the successful physics of the Standard Model, that includes the known motivations for possible

new physics, and does not predict any phenomena that are inconsistent with existing data. Then we ask if the model suggests there will be new physics in the region accessible to LEP.

Luckily we have such a model, one which adds a new symmetry called "supersymmetry" to those we already know. All particles have a property called spin. Some (photons, Z, etc.) have spin that is an integer multiple of a basic unit; they are called bosons. The others (electrons, quarks, etc.) have spin that is a half-integer multiple and are called fermions. Under the rules of quantum theory bosons and fermions behave