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PERSONALIA

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In memory of Alekseĭ Alekseevich Tyapkin

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Professor Alekseĭ Alekseevich Tyapkin, an outstanding physicist, Scientist Emeritus of the Russian Federation, DSc, Chief Research Scientist of the Joint Institute of Nuclear Research (JINR) in Dubna passed away on November 10, 2003.

Tyapkin was born in Moscow on December 26, 1926. Having graduated in 1950 from the Moscow Mechanics Institute — now the widely known MIFI [Moscow State Engineering Physics Institute (Technical University)] — he joined the I V Kurchatov Institute of Atomic Energy. In 1953 Tyapkin moved to JINR.

The formal steps of his career as a scientist were straightforward: PhD in Physics and Mathematics (1959), DSc in Physics and Mathematics (1964), Professor (1967), Head of the Chair of Elementary Particle Physics in the Physics Department of Moscow State University (1988).

The legacy of Tyapkin the physicist is exceptionally rich and multifaceted. It would be fair to say that his principal forte as a scientist was the originality thought processes; this allowed him to tackle the most complicated and sometimes quite unexpected problems in physics, and to solve them successfully.

In 1952, Tyapkin showed for the first time the feasibility of strong particle focusing in the alternating-sign magnetic system of the ring accelerator. Using this principle, a ring cyclotron was designed and built at the P N Lebedev Physical Institute of the Academy of Sciences of the USSR.

In 1955, independently of the renowned Italian physicist M Conversi, he proposed the controlled high-voltage pulsed supply of gas discharge counters and then designed a pioneer pulsed hodoscope with Geiger counters; using them, he carried out a number of experiments at the end of the 1950s, measuring the polarization of recoil protons in elastic πp-scattering and measuring the spin correlation coefficient in elastic pp-scattering. To test the hypothesis of anomalous interaction that the muon neutrino could possess (L B Okun', I Yu Kobzarev, 1961), an experiment was run at the High-Energy Laboratory using a hodoscopic system of counters. A A Tyapkin, V I Veksler, and B M Pontecorvo took part in the experiment. The results showed that the neutrino does not manifest any anomalous interaction. This was the first neutrino experiment performed on an accelerator. The same technique was used by Tyapkin and Yu D Prokoshkin in a high-precision experiment on measuring the mass difference between the negative and neutral pion (published in 1966). For twenty years this result was unsurpassed in accuracy.

The method of a controlled pulsed supply of gas discharge detectors proposed by Tyapkin formed the basis of spark chamber techniques widely used in high-energy physics. In 1956, he came up with the idea of building the spark chamber based on a controlled pulsed supply of planar spark counters, after which several groups at Dubna, Tbilisi, Moscow, and Yerevan started the development of spark chambers. These groups achieved considerable success in the then frontline technique of track detectors — spark chambers with discharge along particle tracks tilted with respect to the field direction.

In the 1970s, a group led by Alekseĭ Alekseevich built a very large physics device: the five-meter-long magnetic spark spectrometer for the Serpukhov proton accelerator, the most powerful one at the time. A joint experiment with Italian physicists on this machine led to the discovery of radially excited states of the pion and confirmed other known resonances (1980 – 1984).

Alekseĭ Alekseevich Tyapkin
(26.12.1926 – 10.11.2003)

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Translated by V I Kisin

In 1975, Tyapkin pioneered a hypothesis on the possibility of charm hypernuclei formed by capturing the lightest charm baryon into the nucleus. This hypothesis stimulated an experimental search for such nuclear fragments and a long series of theoretical papers.

In 1976, Tyapkin proposed the original idea of extending the Sakata – Okun' – Markov baryon model that made it possible to generate results that were identical to those of the quark model and to predict that baryons have higher interaction cross sections only at superhigh energies.

The nontriviality of Tyapkin's thinking also manifested itself in that, still remaining predominantly an experimentalist, he bravely embarked on discussing general physics problems and generated very important results in the process. He was the first to solve the problem of taking into account background measurements when analyzing events by the maximum likelihood technique and the problem of small samples of random exponentially distributed events. In the field of statistical description of dynamic systems Tyapkin was the first to formulate and solve the problem of determining the trajectory in the phase space separately for phase variables on the basis of known statistical distributions. He was the first to explain the decisive role of the macroscopic indistinguishability of microscopic states in producing irreversibility in statistical physics.

In 1993, Tyapkin advanced a hypothesis on the existence of a new type of optical emission by relativistic particles, emitted strictly ahead along the trajectory of the particle as a result of the stimulated radiation mechanism when gas pressure is below the threshold of the Vavilov – Cherenkov radiation.

Tyapkin significantly extended the understanding of special relativity and quantum mechanics; for example, he gave a detailed description of the convention-type notion of simultaneity, and clarified the decisive role of the universality of the properties of physical processes in determining the corresponding metric properties of space-time.

The inclusion of Professor Tyapkin in 1988 on the Editorial Board of the journal *Foundations of Physics Letters* was a sign of international recognition of his important contribution to progress in fundamental aspects of physics.

In parallel with his active and fruitful research activities, Tyapkin invested much time and effort in raising new generations of researchers. The courses he taught to students at the Chair of Elementary Particle Physics of Moscow State University included Statistical Methods of Processing and Analyzing Experimental Data, Modern Methods of Particle Detection, and also lectures on selected aspects of high-energy physics.

Tyapkin was more than just a highly talented scientist: he was a brilliant, extraordinary person and an active sportsman. He was invariably on the Board of the House of Scientists, an organizer of fascinating philosophical discussions, an author of profound science-popularizing articles and reviews, a blindingly brilliant polemicist — this is how he survives in the memory of his colleagues, collaborators, and students. He was a passionate alpine skier (it is no accident that the artificial hill for skiers in Dubna was christened the Tyapkin summit), and he also held the rank of sports master in water skiing; he had done a very great deal to help found and then expand the water skiing club in Dubna.

Anyone who knew Alekseĭ Alekseevich Tyapkin will long keep in their heart the warmth of this outstanding human being.

Ts D Vylov, V G Kadyshevskiĭ, V D Kekelidze,
A A Logunov, Yu Ts Oganesyan, A G Ol'shevskiĭ,
M I Panasyuk, N A Rusakovich, I A Savin,
A N Sisakyan, V I Trukhin, D V Shirkov