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PERSONALIA

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Yury Mikhailovich Shatunov (on his 70th birthday)

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We celebrate the 70th birthday of the outstanding scientist and Corresponding Member of the Russian Academy of Sciences (RAS), Yury Mikhailovich Shatunov, who was born in Barnaul on 5 September 1943. He started his path in science under the guidance of A N Skrinsky, having already joined the staff of the Siberian Branch of the USSR Academy of Sciences in 1963 (SB AS USSR), while still a student in the Physics Department of Novosibirsk State University.

Shatunov's research activities began at the world's first electron–positron collider, VEPP-2 ('Colliding electron–positron beams-2'). In 1970–1974, the VEPP-2M collider (a modification of the VEPP-2) was developed and built with his most active participation. It worked in the same energy range up to 2×0.7 GeV, but at a much higher luminosity; it was designed for experiments in elementary particle physics. The VEPP-2M unit with colliding electron–positron beams remained the main information supplier in this range of particle energies for 25 years. This became possible owing to the studies of the collision effects conducted by Yu M Shatunov, to the nonstop modernization of the system, and to the increase in its luminosity.

Shatunov's pioneering work in the experimental study of radiative polarization of electrons and positrons became world famous. Research on the dynamics of particle spins in storage rings, the suppression of the depolarization effect of spin resonances, and the development of techniques for operational control of the degree of beam polarization, conducted by Yu M Shatunov, made it possible to set up a completely new class of high-precision metrological experiments on colliding beams.

It is important to mention the experiments which compared anomalous magnetic moments of the electron and the positron that Yu M Shatunov carried out in 1976–1987 at the VEPP-2M storage ring. It was shown as a result that the difference between anomalous magnetic moments did not exceed 10^{-11} of the total magnetic moment of the particle; at the time, this was the best available test of the *CPT*-theorem with leptons.

The method of absolute calibration of particle energy by measuring the frequency of spin precession — namely, the resonance depolarization method — allowed Shatunov's group to conduct a number of high-precision measurements of the masses of elementary particles on the electron–positron colliders of the Budker Institute of Nuclear Physics of the Siberian Branch of the Russian Academy of Sciences (INP SB RAS). In 1989, Yu M Shatunov, as a member of a group of authors, received the State Prize of the USSR for implementing such research programs.

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Yury Mikhailovich Shatunov

Afterwards, the method of absolute particle energy calibration based on resonance depolarization found applications in practically every system involving colliding beams (SPEAR, DORIS, CESR, HERA, LEP), as well as on many storage rings used as sources of synchrotron radiation.

In the course of the 'beam–beam' studies, which limited the luminosity of the VEPP-2M collider, Yu M Shatunov and his colleagues formulated the concept of 'round' colliding beams, which made it possible to considerably increase the luminosity of the colliders. This idea was incorporated into the project of the new VEPP-2000 (colliding electron–positron beams-2000) storage ring, which was created at the INP SB RAS under the guidance of Yu M Shatunov. The successful launch of the new device in 2007 and the first results of studying the collision effects confirmed the correctness of the concept of round colliding beams; this work allowed the team to rapidly reach the designed level of luminosity, exceeding by an order of magnitude the VEPP-2M luminosity. Owing to this, it became possible to conduct a series of new high-precision experiments running in the range of light vector mesons. There is no doubt that the VEPP-2000 collider with 2 modernized SND (spherical neutral detector) and CMD (cryogenic magnetic detector) detectors will lead

researchers in the nearest future to a new level of studies in the c.m. energy range extended to 2×1 GeV. In 2012, the work on implementation of the idea of round colliding beams and the creation of the VEPP-2000 collider received the V I Veksler Prize of the Russian Academy of Sciences.

Yu M Shatunov's multifaceted creative activities have been fully recognized by the scientific community, both in this country and abroad. In 2008, Yu M Shatunov was elected Corresponding Member of the Russian Academy of Sciences. He is the Chair of the Section of the Scientific Council of RAS on charged particle accelerators; works actively in the section of beam dynamics of the International Committee for Future Accelerators (ICFA), and was elected a member of the European Particle Accelerator Conference (EPAC) committee and a member of the International Committee for High-Energy Spin Physics. Yu M Shatunov is an active participant in a number of international collaborations: on measuring the anomalous muon magnetic moment at the Brookhaven National Laboratory (BNL), USA; on experiments with longitudinally polarized beams in the Netherlands at the National Institute for Subatomic Physics (NIKHEF); in Germany at the Deutsches Elektronensynchrotron (DESY); at the Massachusetts Institute of Technology (MIT) and at the BNL in the USA. His development of spin rotators and Siberian Snakes based on helical magnets made it realistic to implement the acceleration of polarized protons to energies of hundreds of GeV (RHIC, HERA). In 2006, he proposed a circuit of partial Siberian Snakes for the U-70 synchrotron (in Protvino) which will make it possible to accelerate protons with a polarization of above 70% without much modification.

Yu M Shatunov is constantly devoted to retraining his research colleagues and takes part in the work of the Departments of General Physics and Physics of Accelerators at Novosibirsk State University. He delivers a unique course of lectures entitled "Polarized particles in accelerators and storage rings."

Yu M Shatunov is one of the most important experts in accelerator physics, on colliding and polarized charged particle beams. Without any doubt, the laboratory that he heads has for dozens of years kept its leading positions in all these fields of physics.

We wish Yury Mikhailovich good health and new successes in his multifaceted scientific activities and organizational work.

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