Popov Vladimir

Position: Leading scientist

Institute of Theoretical and Experimental Physics

Period covered: 1970 - present

I Scientific Work

In recent years Popov's research focus on: the theory of multiphoton ionization of atoms and ions, including the relativistic generalization of Keldysh ionization theory for the case of multicharged ions; the process of electron-positron pair production from vacuum by the field of intense optical and X-ray lasers; development of the "imaginary time" method in theory of tunneling of relativistic particles; application of the Feynman method of disentangling of noncommuting operators to non-stationary problems of quantum mechanics.

II Conferences and educational activities

1. International Conference on Theoretical Physics, Lebedev Institute, Moscow, April 2005

2. Conferences MEPHI - 2000, 2002, 2005, 2006, 2007, 2008, Moscow Engineering Physical Institute, Moscow

3. XVIII Conference "Fundamental Atomic Spectroscopy", Zvenigorod, October 2007

III Service activities

Journal of Experimental and Theoretical Physics, member of editorial board (1993 -)

Popov Vladimir Stepanovich was born in Moscow in 1932. He received his diploma of physics from Moscow State University in 1955, joined the Institute of Theoretical and Experimental Physics (ITEP, Moscow) in 1959 as a junior researcher, received PhD in 1961, became senior researcher in 1964 and leading researcher in 1987. He received Doctor of Science (Physics) degree with the thesis "Atomic states at $Z > 137$ and tunnel effects in intense fields" in 1974 at ITEP, and became Professor in 1993. He also taught students in Moscow Physical-Technical Institute from 1964 to 1993, where he gave lectures on classical and quantum electrodynamics, quantum mechanics, theory of coherent states, quantum optics, and mathematical methods of quantum mechanics. Prof. Popov is a member of JETP (Journal of Experimental and Theoretical Physics) editorial board since 1993.

Popov's research has covered atomic and nuclear physics, laser physics, mathematical physics and a variety topics in quantum mechanics. He published more than 200 research papers. His main scientific activities were: theory of atomic processes in intense laser fields (particularly, tunnel and multiphoton ionization of atoms and ions); QED of superstrong Coulomb fields ($Z > 137$ problem), critical nuclear charge Z_{cr} and spontaneous production of positrons in collisions of heavy nuclei, $Z_1+Z_2 > Z_{cr} \approx 170$; e^+e^- pair production from vacuum by intense electromagnetic fields (Schwinger effect), in particular by two colliding laser pulses; quasiclassical approximation and 1/n-expansion in quantum mechanics and atomic physics; generalization of the WKB method for quasistationary states and resonances; "imaginary time" method in problems of tunneling of nonrelativistic and relativistic particles; Zel'dovich effect in atomic and nuclear physics, i.e. rearrangement of atomic spectrum due to strong short-range interaction; energy spectrum of the hydrogen atom in superstrong magnetic field; higher orders of perturbation theory for Stark effect, anharmonic oscillator and some other potentials; summation of divergent perturbation series in quantum mechanics and field theory; Feynman method of disentangling of noncommuting operators, its connection with group representation theory and application to some non-stationary problems of quantum mechanics.