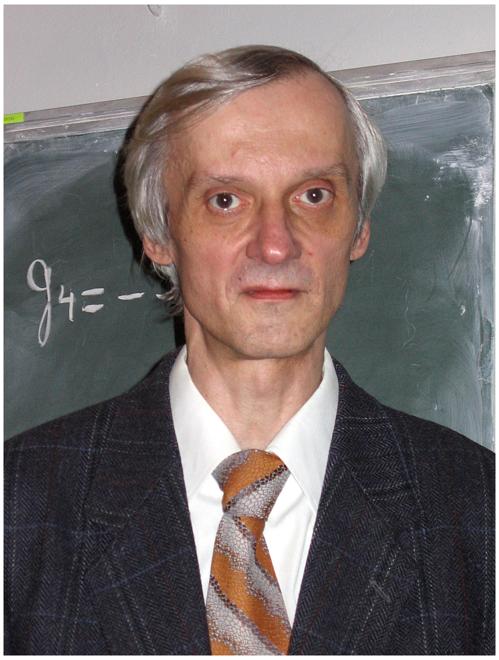
Editorial

In honour of doctor Volodymyr Tretyak on the occasion of his 50th birthday



Dr. Volodymyr Tretyak is a well-known Ukrainian scientist working in the field of theoretical physics.

Volodymyr Ivanovych Tretyak was born on April 24, 1955, in Lviv. In 1972 he entered the Physics department of the Ivan Franko Lviv State University and specialized at the Theoretical Physics chair. There he got the taste for theoretical and mathematical studies under the beneficial influence of brilliant teachers [1]. Volodymyr Tretyak was a constant participant of the seminars of the eminent Ukrainian physicist Roman Gaida [2] devoted to the problems of relativistic physics.

After graduating from the University in 1977 V.Tretyak worked as a teacher of physics at school in Lviv region for a year. His scientific activities started in 1978 at the Institute for Applied Problems of Mechanics and Mathematics. There Tretyak joined the research team in relativistic mechanics founded by Roman Gaida. (Since May, 1981 as a junior research fellow). First, under the guidance of Professor Gaida, and then, in collaboration with him, with Yurij Kluchkovsky and with other scientists, Tretyak took up non-traditional (especially, at the beginning of 80th) field of theoretical physics. This is the so-called "relativistic direct interaction theory" (RDIT). The theory describes relativistic systems of interacting particles without using the notion of field as mediator of interaction [3]. The main achievement of the group was the construction of three-dimensional Lagrangian formulation of RDIT. Volodymyr Tretyak quickly swiches on to this work and studies group-theoretical aspects of the formalism. The results were published in the four frequently cited works [4] in 1980's.

On this firm ground Tretyak develops the Dirac's idea of forms of relativistic dynamics. In 1950 Dirac proposed to construct the relativistic Hamiltonian dynamics of particle system using some spacelike (or lightlike) hypersurface as a configuration space [5]. This program was never accomplished by Dirac in view of its complexity.

Later on various solutions to this program were proposed by other theoreticians but the physical meaning of all these results was unclear.

The young researcher considers this problem in great generality and perspective. First of all Tretyak formulates a mathematically rigorous definition of particle configuration space as a disjoint union of arbitrary space- or light-like hypersurfaces. Then he constructs the realization of a Lie group on this space by means of Lie-Bäcklung transformations and hence studies its properties. Tretyak determines the structure of Poincaré-invariant Lagrangians and conserved quantities in an arbitrary form of relativistic dynamics. Moreover, he reveals the relations between different forms of dynamics and proves their equivalence. Finally, Tretyak proposes the subsequent approximation scheme for the transition to the canonical formalism which, actually, completes the Dirac's program and eliminates most of controversial questions. This work made a Ph. D. thesis [6] defended at the famous Serpukhov Institute for High Energy Physics in 1982.

In 1988 Tretyak joined Institute for Condensed Matter Physics of National Academy of Sciences of Ukraine with a position of a senior research fellow. He becomes a councelor to young physicists. Being inclined to a mathematical grace and rigorous results, Volodymyr Tretyak looks for new schemes providing an exact relativistic description of particle system. Tretyak lavishly shares his ideas with his followers. As a result he and his young colleague Volodymyr Shpytko built a number of interesting exactly solvable 2- and N-particle relativistic models in two-dimensional front form of dynamics. Shpytko quantized them in his Ph. D. thesis [7,8]. He also proposed a solvable extension of two-dimensional front form in four-dimensional space-time, the "isotropic" form of dynamics, which was developed together with Askold Duviryak [8].

Another collection of works is devoted to relativistic generalization of centre-of-mass variables. The relativistic generalization of CM-variables was pursued by Professor Gajda. Tretyak's idea was to use such variables in the Lagrangian formalism in order to simplify not only a solution but the formulation of the N-body problem itself. Using a special representation of the Poincaré group Gaida, Tretyak and Yaremko constructed the relativistic CM-variables [9]. In these terms infinite series for Lagrangian and Hamiltonian functions convert into compact expressions, and a motion of N-particle system as a whole separates from internal motion of its constituents. Using these results Yurij Yaremko solved the relativistic two-body problem in his Ph. D. thesis in 1995 [10].

Volodymyr Tretyak defended the Doctor of Science thesis [11] in 1996. He stated the exact structure of Lagrangians of particles interacting by means of classical relativistic fields of arbitrary mass and spin. The guideline leading from the classical field theory towards the relativistic particle dynamics was a surprising union of the formalism of Fokker action integrals and the Schwinger theory of sources. Another bridge between classical electrodynamics and the relativistic Hamiltonian dynamics of charged particles was built by Tretyak and his post-graduate student Andrij Nazarenko by means of Dirac's constrained formalism. In their works [12] they got a number of interesting results, including an exact expression for partition function of the relativistic system of interacting charged particles.

Many of physical ideas by Tretyak are self-sufficient and shaped in perfect mathematical form. His articles are splendidly concise and his lectures give listeners a great pleasure.

Tretyak's scientific activities, besides research, involve membership in Shevchenko Scientific Society and Ukrainian Physical Society. He participates in the editorial boards of "Journal of Physical Studies" and "Collected Physical Papers" of Shevchenko Scientific Society. Volodymyr Tretyak is a member of the Specialized Scientific Council at the Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine.

Friends and Editorial Board of "Condensed Matter Physics" wish the jubilleer and his family to stay in good health and to enjoy many happy years of life. The colleagues hope for Dr. Tretyak's new ideas and creative work.

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