

Few-Body Systems Group (Sector 11) at BLTP, JINR

2015 Annual Activity Report

Contents

| | | |
|----------|--|-----------|
| 1 | Staff of the BLTP Sector 11 in 2015 | 2 |
| 2 | Main results | 3 |
| 3 | Publications | 6 |
| 3.1 | Journal publications | 6 |
| 3.2 | Articles in paper collections/conference proceedings | 7 |
| 3.3 | Articles accepted for publication | 8 |
| 3.4 | Preprints and data bases | 9 |
| 3.5 | Conference presentations | 10 |
| 3.6 | Seminar talks | 14 |
| 4 | Visits | 14 |
| 4.1 | Conferences, schools | 14 |
| 4.2 | Collaboration visits | 16 |
| 5 | Visitors | 17 |
| 6 | Teaching | 18 |
| 7 | Organizational activity | 19 |
| 8 | Awards, prizes, thesis defences, etc. | 21 |

1 Staff of the BLTP Sector 11 in 2015

1. Vladimir B. Belyaev, Prof., Dr. Sc., Principal Researcher
2. [Andrey A. Bulychev](#), Dr., Junior Researcher
3. [Ilyaz S. Ishmukhamedov](#), M.Sc., Junior Researcher
4. [Sabit S. Kamalov](#), Dr., Senior Researcher
5. [Elena A. Kolganova](#), Dr., Senior Researcher
6. [Daniyar Janseitov](#), M.Sc., Junior Researcher
7. [Vladimir N. Kondratyev](#), Dr., Senior Researcher
8. [Anastasia V. Malykh](#), Dr., Researcher
9. [Vladimir S. Melezhik](#), Dr. Sc., Leading Researcher
10. [Alexander K. Motovilov](#), Dr.Sc., Head of Sector
11. [Yury V. Popov](#), Dr., Senior Researcher (part-time)
12. [Vasily V. Pupyshev](#), Dr.Sc., Leading Researcher
13. [Evgeni A. Solov'ev](#), Dr.Sc., Leading Researcher
14. [Dinara S. Valiolda](#), M.Sc., Junior Researcher
15. [Sergue I. Vinitsky](#), Dr.Sc., Leading Researcher

[Olga P. Klimenko](#) (Ph.D. Student, since November 2014)

[Artem A. Korobitsin](#) (Ph.D. Student, since November 2012)

[Evgeny A. Koval](#) (Ph.D. Student, since November 2013)

[Oksana A. Koval](#) (Ph.D. Student, since November 2013)

2 Main results

Electron-impact double ionization of a helium atom in the presence of laser radiation with low frequency and intensity is studied theoretically in [BK]. The kinematical regime of high impact energy and large momentum transfer, with two fast and one slow electrons in the final channel, is considered. Fully differential cross sections corresponding to the laser-assisted $(e, 3e)$ and $(e, 3 - 1e)$ processes are calculated for different models of the target state. The angular distributions of the slow ejected electron are found to be seriously modified by the laser field and, in contrast to the field-free case, strongly dependent on the electron-electron correlations in helium. At the same time, the laser-assisted $(e, 3 - 1e)$ results very slightly differ from those in the absence of a laser field.

[BK] A. A. Bulychev and K. A. Kouzakov, “Laser-assisted $(e, 3e)$ collisions in helium at high impact energy and large momentum transfer”, *Phys. Rev. A* **91**, 023413 (2015) [8 pages].

The few lowest two-body energy levels were accurately calculated nonperturbatively in [IAZ] taking into account anharmonic terms of a trapping potential that confines the motion of atoms in the trap. Such calculations were mostly carried out by other authors in the framework of first order perturbation theory. We also performed a calculation for an exact trap potential which, for a one-dimensional geometry, hasn't been considered by anyone before. We compare our results with the first order perturbation theory and find a region where the discrepancy between the two methods becomes large. Our computational scheme allows us to easily treat an interatomic interaction potential as a delta function which effectively represents a realistic finite-range interaction.

[IAZ] I. S. Ishmukhamedov, D. T. Aznabayev, and S. A. Zhaugasheva, “Two-body atomic system in a one-dimensional anharmonic trap: The energy spectrum”, *PEPAN Letters* **12**(5), 680-688 (2015).

The properties of the rare gas clusters are studied in [KrK]. Observables of all possible homogeneous and heterogeneous rare gas dimers, and helium and neon trimers in different potential models are calculated.

[KrK] A. A. Korobitsin and E. A. Kolganova, “The rare gas clusters”, *Bulletin of the Russian Academy of Sciences: Physics*, accepted for publication.

Magnetic enhancement for a yield of ^{44}Ti isotope at an unchanged ^{56}Ni volume is revealed for explosive nucleosynthesis in dynamo-active supernovae [KnK]. Such magnetization effects in nuclide abundances are consistent with data of supernova remnant direct observations and galactic chemical evolution [KKM].

[KnK] V. N. Kondratyev and Yu. V. Korovina, “Synthesis of chemical elements in dynamo active supernovae”, *JETP Lett.* **102**, 131–134 (2015).

[KKM] V. N. Kondratyev, Yu. V. Korovina, T. Mishenina, “Nuclear magics at magnetorotational supernova explosion” *Odessa Astronomical Publications*, **28**, 32–34 (2015).

Quantum mechanical three-body problem for two identical fermions of mass m and distinct particle of mass m_1 in the universal low-energy limit of zero-range two-body interaction is studied [KaM]. It is found that an additional three-body parameter b should be introduced to describe the wave function in the vicinity of the triple-collision point, which provides unambiguous formulation of the problem (self-adjointness of three-body Hamiltonian) in the mass-ratio interval $\mu_r < m/m_1 \leq \mu_c$ ($\mu_r \approx 8.619$, $\mu_c \approx 13.607$). In the most important sector of angular momentum and parity $L^P = 1^-$ the dependences of the bound-state energies on m/m_1 and b are numerically calculated and qualitatively analysed by constructing a simple model.

[KaM] O. I. Kartavtsev and A. V. Malykh, “Universal description of three two-component fermions”, [arXiv:1512.06786](https://arxiv.org/abs/1512.06786).

In [SMS], we develop and analyze a theoretical model to study p -wave Feshbach resonances of identical fermions in atomic waveguides by extending the two-channel model of Lange et al (2009 Phys. Rev. A 79 013622) and Saeidian et al (2012 Phys. Rev. A 86 062713). The experimentally known parameters of Feshbach resonances in free space are used as input of the model. We calculate the shifts and widths of p -wave magnetic Feshbach resonance of 40 K atoms emerging in harmonic waveguides as p -wave confinement induced resonance (CIR). Particularly, we show a possibility to control the width and shift of the p -wave CIR by the trap frequency and the applied magnetic field which could be used in corresponding experiments. Our analysis also demonstrates the importance of the inclusion of the effective range in the computational schemes for the description of the p -wave CIRs contrary to the case of s -wave CIRs where the influence of this term is negligible.

[SMS] S. Saeidian, V. S. Melezhik, and P. Schmelcher, “Shifts and widths of p -wave confinement induced resonances in atomic waveguides”, *J. Phys. B* **48**, 155301 (2015) [10 pages].

Recently, a number of electron momentum spectroscopy measurements for the ionization of atoms and molecules have shown that the triple differential cross section has an unexpected higher intensity in a low recoil momentum regime, if the outer shell is not the s -one. This surprising result is called the turn-up effect. Our aim was to theoretically investigate such an effect by studying the case of the ionization of atomic hydrogen in an excited state using the 3C model of the final state. A comparison is also made of the findings of the present method with those of the plane wave impulse approximation and distorted wave models. It was shown that such an effect is connected mainly with short-range correlations in a heavy atom than with the long-range coulomb correlations [CDC].

[CDC] C. Dal Cappello, F. Menas, S. Houamer, Yu.V. Popov, and A.C. Roy, “A study of the turn-up effect in the electron momentum spectroscopy”, *J. Phys. B* **48**, 205201 (2015) [12 pages].

Let A be a self-adjoint operator in a separable Hilbert space. Suppose that the spectrum of A is formed of two isolated components σ_0 and σ_1 such that the set σ_0 lies in a finite gap of the set σ_1 . Assume that V is a bounded additive self-adjoint perturbation of A , off-diagonal with respect to the partition $\text{spec}(A) = \sigma_0 \cup \sigma_1$. It is known that if $\|V\| < \sqrt{2} \text{dist}(\sigma_0, \sigma_1)$, then the spectrum of the perturbed operator $L = A + V$ consists of two disjoint parts ω_0 and ω_1 which originate

from the corresponding initial spectral subsets σ_0 and σ_1 . Moreover, for the difference of the spectral projections $E_A(\sigma_0)$ and $E_L(\omega_0)$ of A and L associated with the spectral sets σ_0 and ω_0 , respectively, the following sharp norm bound holds:

$$\|E_A(\sigma_0) - E_L(\omega_0)\| \leq \sin \left(\arctan \frac{\|V\|}{\text{dist}(\sigma_0, \sigma_1)} \right).$$

Paper [M15] presents a new proof of this bound for $\|V\| < \text{dist}(\sigma_0, \sigma_1)$.

[M15] A. K. Motovilov, “An alternative proof of the a priori $\tan \Theta$ Theorem”, *Theor. Math. Phys.* **186:1**, 83–92 (2016); *arXiv:1510.02316*.

The theory of two-dimensional Coulomb scattering of a quantum particle is developed. The wave-function of this particle, the Green function and all radial components of these functions are studied [PVV1]. For the modules of those components the uniform major bounds are derived. For the Green function and its radial components the integral representations are obtained. The structure of the radial wave-functions is investigated [PVV2]. A particular attention is paid to the low-energy limit. The expansions of the wave-function and the radial wave-functions over integer powers of the wave number and the Bessel functions of real order are constructed [PVV3]. It is proven that the finite sums of these expansions are the asymptotics of the wave-functions in the low-energy limit.

[PVV1] V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The wave functions and Green functions”, *JINR Preprint P4-2015-17, Dubna, JINR, 2015*.

[PVV2] V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The structure of radial wave functions”, *JINR Preprint P4-2015-20, Dubna, JINR, 2015*.

[PVV3] V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: Low-energy asymptotics”, *JINR Preprint P4-2015-76, Dubna, JINR, 2015*.

Development of a dynamical adiabatic theory of atomic collisions has been completed [GS]. As an example, interference effects in slow $\text{He}^{2+} + \text{H}(1s)$ charge-exchange collisions are analyzed. Analytic continuation of the dynamical adiabatic scaled-energy eigenvalues into the complex plane of internuclear separation R for the HeH^{2+} system is used to identify the relevant branch points responsible for both the radial and rotational non-adiabatic transitions leading to the electron capture process. The calculated electron capture probabilities are compared with the results of hyperspherical close-coupling calculations.

[GS] T. Grozdanov and E. A. Solov'ev, “Dynamical adiabatic theory of atomic collisions: Charge exchange in collisions of He^{2+} with $\text{H}(1s)$ ”, *Phys.Rev. A* **92**, 042701 (2015) [10 pages].

A calculation scheme for generating bases for irreducible representations of the laboratory and intrinsic point symmetry groups acting in the space $L^2(SO(3))$ of a rotation group is presented. The method of generalized projection operators is used. The generalized projection operators for the intrinsic group acting on $L^2(SO(3))$ are constructed. The efficiency of the algorithm is investigated by calculating the bases for both laboratory and intrinsic octahedral groups irreducible representations for nuclear shapes [SVA]. The calculation scheme realized as program of KANTBP

4M implemented in the computer algebra system MAPLE for solutions to a given accuracy of boundary problem and eigenvalue problem for the system of ordinary differential equations of the second order with continuous or piecewise continuous real or complex-valued coefficients. Discretization of the boundary problems are implemented by the finite element method with the interpolation Hermite polynomials preserves the property of continuity of derivatives of the desired solutions. For the calculation of metastable states with complex eigenvalues of energy, or to solve the problem for bound states with boundary conditions depending on the spectral parameter the Newtonian iteration scheme is implemented [SVB].

[SVA] A.A. Gusev, V.P. Gerdt, S.I. Vinitzky, V.L. Derbov, A. Gózdź, and A. Pędrak, “Symbolic algorithm for generating irreducible bases of point groups in the space of $SO(3)$ group”, *Lect. Notes Comp. Sc.* **9301**, 166–181 (2015)..

[SVB] A.A. Gusev, L.L. Hai, O. Chuluunbaatar, V. Ulziibayar, S.I. Vinitzky, V.L. Derbov, A. Gózdź, and V.A. Rostovtsev, “Symbolic-numeric solution of boundary-value problems for the Schrodinger equation using the finite element method: scattering problem and resonance states”, *Lect. Notes Comp. Sc.* **9301**, 182–197 (2015).

3 Publications

3.1 Journal publications

1. V.B. Belyaev, P. Ricci, F. Šimkovic, J. Adam Jr., M. Tater, and E. Truhlik, “Consequence of total lepton number violation in strongly magnetized iron white dwarfs”, *Nucl. Phys. A* **937**, 17–43 (2015).
2. A. A. Bulychev and K. A. Kouzakov, “Laser-assisted ($e, 3e$) collisions in helium at high impact energy and large momentum transfer”, *Phys. Rev. A* **91**, 023413 (2015) [8 pages].
3. C. Dal Cappello, F. Menas, S. Houamer, Yu.V. Popov, and A.C. Roy, “A study of the turn-up effect in the electron momentum spectroscopy”, *J.Phys. B* **48**, 205201 (2015) [12 pages]..
4. A. Gózdź , A. Pędrak , A. Dobrowolski, A. Szulerecka, A. Gusev , and S. Vinitzky. “Shapes and symmetries of nuclei” *Bulg. J. Phys.* **42**, 494–502 (2015).
5. T. Grozdanov and E. A. Solov’ev, “Dynamical adiabatic theory of atomic collisions: Charge exchange in collisions of He^{2+} with $H(1s)$ ”, *Phys.Rev. A* **92**, 042701 (2015) [10 pages].
6. A. A. Gusev, V.P. Gerdt, S.I. Vinitzky, V. L. Derbov, A. Gózdź, A. Pędrak, “Symbolic algorithm for generating irreducible bases of point groups in the space of $SO(3)$ group”, *Lecture Notes in Computer Science.* **9301**, 166–181 (2015).
7. A.A. Gusev, L.L. Hai, O. Chuluunbaatar, V. Ulziibayar, S.I. Vinitzky, V.L. Derbov, A. Gózdź, and V.A. Rostovtsev, “Symbolic-numeric solution of boundary-value problems for the Schrodinger equation using the finite element method: scattering problem and resonance states”, *Lecture Notes in Computer Science* **9301**, 182–197 (2015).

8. I. S. Ishmukhamedov, D. T. Aznabayev, S. A. Zhaugasheva, “Two-body atomic system in a one-dimensional anharmonic trap: The energy spectrum”, *PEPAN Letters* **12(5)**, 680–688 (2015).
9. I. S. Ishmukhamedov, D. S. Valiolda, and S. A. Zhaugasheva, “Description of ultracold atoms in a harmonic trap”, *News of the National Academy of Sciences of the Republic of Kazakhstan (ISSN 1991-346X). Series: Physics and Mathematics* **3**:301, 120–125 (2015).
10. D. T. Aznabayev, A. K. Bekbaev, I. S. Ishmukhamedov, and V. I. Korobov, “Energy levels of a helium atom”, *PEPAN Letters* **12(5)**, 689–694 (2015).
11. V. N. Kondratyev and Yu. V. Korovina, “Synthesis of chemical elements in dynamo active supernovae”, *JETP Lett.* **102**, 131–134 (2015).
12. V. N. Kondratyev, Yu. V. Korovina, T. Mishenina, “Nuclear magics at magnetorotational supernova explosion” *Odessa Astronomical Publications* **28**, 32–34 (2015).
13. E. A. Koval, O. A. Koval and V. S. Melezhik, “Numerical solution of the quantum scattering problem in the plane”, *PEPAN Lett.* **12(3)**, 448–451 (2015).
14. V. V. Pupyshv, “Effective-radius approximation in the problem of two-dimensional scattering by a central short-range potential”, *Theor. Math. Phys.* **182**, 264–283 (2015)..
15. S. Saeidian, V. S. Melezhik, and P. Schmelcher, “Shifts and widths of p-wave confinement induced resonances in atomic waveguides”, *J. Phys. B* **48**, 155301 (2015) [10 pages].
16. V.V. Serov, V.L. Derbov, B. Joulakian, T.A. Sergeeva, S.I. Vinitisky, O. Chuluunbaatar, A.A. Gusev, A.A. Bulychev, K.A. Kouzakov, and Yu.V. Popov “Photoionization and ionization by electron impact of two-electron atoms and molecules”, *JINR News No.* **3**, 17–21 (2015).
17. E. A. Solov’ev, “Analyticity and the global information field”, *Mathematics* **3**, 40–46 (2015).
18. E. A. Solov’ev, “Liouville’s theorem in classical mechanics and the global information field”, *J. Phys. Math.* **6**, 1000137 (2015) [2 pages].

3.2 Articles in paper collections/conference proceedings

1. J. Adam Jr., V.B. Belyaev, P. Ricci, F. Šimkovic, and E. Truhlik, “SMWDs as SGRs/AXPs and the lepton number violation”, *AIP Conf. Proc.* **1686**, 020028 (2015) [4 pages].
2. A. A. Bulychev, K. A. Kouzakov, and S. I. Vinitisky, “Laser-assisted single and double ionization of helium by electron impact”, *Proc. SPIE* **9448**, 944829 (2015) [10 pages].
3. V.L. Derbov, D.D. Grachev, L.A. Sevastyanov, K.P. Lovetskiy, S.I. Vinitisky, and A.A. Gusev, “Model for spin waves and lasing in monolayer graphene film”, *Proc. SPIE* **9448**, 94481 (2015).
4. H. Gassert, O. Chuluunbaatar, M. Waitz, H.-K. Kim, T. Bauer, A. Laucke, Ch. Muller, J. Voigtsberger, M. Weller, J. Rist, K. Pahl, M. Honig, M. Pitzer, S. Zeller, T. Jahnke, L. Ph. H. Schmidt, S. A. Zaytsev, A. A. Bulychev, H. Schmidt-Boecking, K. A. Kouzakov, R. Doerner, M. S. Schoeffler, and Yu. V. Popov, “Single ionization of helium by fast proton impact:

Searching for projectile coherence”, *Journal of Physics: Conference Series* 635, 022053-022053 (2015).

5. Yu. V. Popov, A. Galstyan, O. Chuluunbaatar, S. Houamer, A. A. Bulychev, M. S. Schoffler, H-K Kim, J. N. Titze, T. Jahnke, L. Ph. H. Schmidt, H. Schmidt-Bocking, and R. Dorner, “Charge transfer processes in proton-helium collisions: The validity of the first Born approximation”, *Journal of Physics: Conference Series* 601, 012008 (2015) [8 pages].

3.3 Articles accepted for publication

1. S. Albeverio and A. K. Motovilov, “Bounds on variation of the spectrum and spectral subspaces of a few-body Hamiltonian”, *Proceedings of the International Conference ‘Nuclear Theory in the Supercomputing Era–2014’*, 23–27 June 2014, Khabarovsk, Russia (accepted for publication).
2. N. Burtebayev, B. A. Duisebayev, Zh. K. Kerimkulov, Y. S. Mukhamejanov, D. K. Alimov, D. M. Janseitov, N. O. Saduev, N. V. Gluschenko, S. B. Sakuta, R. J. Peterson, and L. I. Galanina, “Analysis of elastic and inelastic scattering of alpha particle and ^3He ions from ^9Be , ^{13}C nuclei and deuterons from ^{11}B nuclei at low energies”, *Proceedings of the National Academy of Sciences of the Republic of Kazakhstan* (accepted for publication).
3. N. Burtebayev, Zh. K. Kerimkulov, A. S. Demyanova, S. B. Sakuta, A. K. Morzabayev, Y. S. Mukhamejanov, D. M. Janseitov, and M. Nassurlla, “Investigation of α -particle scattering from ^{13}C at energy 29 MeV”, *Journal of Physics: Conference Series* (accepted for publication).
4. N. Burtebayev, Zh. K. Kerimkulov, Y. S. Mukhamejanov, D. M. Janseitov, and M. Nassurlla, “Study of elastic and inelastic scattering of α -particles from ^{11}B nuclei in the energy range of 29-54 MeV”, *Journal of Physics: Conference Series* (accepted for publication).
5. V. N. Kondratyev, “Magic nuclei at explosive dynamo activity”, *Eur. Phys. Web Conf.* (accepted for publication).
6. V. N. Kondratyev, “Nuclear magics at explosive magnetization”, *Eur. Phys. Web Conf.* (accepted for publication).
7. V. N. Kondratyev and Yu. V. Korovina, “Statistics of magnetar crusts magnetoemission”, *Eur. Phys. Web Conf.* (accepted for publication).
8. V. N. Kondratyev and Yu. V. Korovina, “Magnetoemission of magnetar crust”, *Phys. Atom. Nucl.*, (accepted for publication).
9. O. A. Koval and E. A. Koval, “Numerical integration of the 2D eigenvalue problem: 2D hydrogen atom”, *Proceedings of the XIX International Scientific Conference of Young Scientists and Specialists* (16–20 February 2015, Dubna), BLTP, JINR, Dubna (accepted for publication).
10. A. A. Korobitsin and E. A. Kolganova, “The rare gas clusters”, *Bulletin of the Russian Academy of Sciences: Physics* (accepted for publication).

11. V. S. Melezhik, “Mathematical modeling of ultracold few-body processes in atomic traps”, *EPJ Web of Conf.* (accepted for publication).
12. V. S. Melezhik, “Adiabatic representation in Coulomb three-body problem in the limit of united atom: nuclear widths and shifts of the energy levels of the mesic molecule $t\mu$ ” *Theor. Math. Phys.* (accepted for publication).
13. A. K. Motovilov, “An alternative proof of the a priori $\tan\Theta$ Theorem”, *Theor. Math. Phys.* **186:1**, 83–92 (2016).
14. Yu. V. Popov, K. A. Kouzakov, A. A. Bulychev, and S. I. Vinitzky, “Theory of quasi-elastic atomic reactions in the alternating electric field”, *Theor. Math. Phys.* (accepted for publication).
15. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The wave functions and Green functions” *Theor. Math. Phys.* (accepted for publication).
16. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The structure of radial wave functions” *Theor. Math. Phys.* (accepted for publication).
17. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: Low-energy asymptotics ” *Theor. Math. Phys.* (accepted for publication).

3.4 Preprints and data bases

1. H. Gassert, O. Chuluunbaatar, M. Waitz, H.-K. Kim, T. Bauer, A. Laucke, Ch. Muller, J. Voigtsberger, M. Weller, J. Rist, K. Pahl, M. Honig, M. Pitzer, S. Zeller, T. Jahnke, L. Ph. H. Schmidt, S. A. Zaytsev, A. A. Bulychev, K. A. Kouzakov, H. Schmidt-Boecking, R. Doerner, Yu. V. Popov, and M. S. Schoeffler, “Agreement at last: an experimental and theoretical study on the single ionization of helium by fast proton impact”, *arXiv:1509.02349*.
2. A.A.Gusev, L.Le Hai, O.Chuluunbaatar, and S.I.Vinitzky, “KANTBP 4M - program for solving boundary problems of the system of ordinary second order differential equations”, *Program library JINRLIB (2015)*.
3. O. I. Kartavtsev and A. V. Malykh, “Universal description of three two-component fermions”, *arXiv:1512.06786*.
4. A. K. Motovilov, “An alternative proof of the a priori $\tan\Theta$ Theorem”, *arXiv:1510.02316*.
5. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The wave functions and Green functions”, *JINR Preprint P4-2015-17, Dubna, JINR, 2015*.
6. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The structure of radial wave functions”, *JINR Preprint P4-2015-20, Dubna, JINR, 2015*.
7. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: Low-energy asymptotics ”, *JINR Preprint P4-2015-76, Dubna, JINR, 2015*.
8. S. Saeidian, V. S. Melezhik, and P. Schmelcher, “Shifts and widths of p-wave confinement induced resonances in atomic waveguides”, *arXiv:1503.2469*.

3.5 Conference presentations

1. A. A. Bulychev and K. A. Kouzakov, “Laser-assisted singly and doubly ionizing electron-helium collisions at high impact energy and large momentum transfer”, [XXIX International Conference on Photonic, Electronic and Atomic Collisions](#) (22 – 28 July 2015, Toledo, Spain), poster
2. A. A. Bulychev and K. A. Kouzakov, “Laser-assisted singly and doubly ionizing electron-helium collisions at high impact energy and large momentum transfer”, [Saratov Fall Meeting 2015](#) (22 – 25 September 2015, Saratov, Russia), poster
3. N. Burtebayev, Zh. Kerimkulov, M. K. Baktybayev, B.A. Duisebaev, A.A. Ogloblin, A. S. Demyanova, S.B. Sakuta, [D.M. Janseitov](#), and M. Nassurlla, “Investigation of α -particles scattering from ^{13}C at energy 29 and 65 MeV”, [IV Annual Conference of Young Scientists and Specialists – Neutrons and Neutrinos: fundamental properties, experiments and applied research](#), (6-13 June 2015, Alushta, Crimea, Russia), oral presentation
4. N. Burtebayev, [D.M. Janseitov](#), Zh. Kerimkulov, A. S. Demyanova, A. D. Duisebayev, and M. Nassurlla, “Investigation of α -particles scattering from ^{13}C at energy 29 MeV”, [XIX International Scientific Conference of Young Scientists and Specialists](#) (16–20 February 2015, Dubna, Russia), poster.
5. [T. Grozdanov](#) and E. A. Solov’ev, “Dynamical adiabatic theory of atomic collisions”, [International Conference “Models in Quantum Field Theory” dedicated to A.N.Vasiliev](#) (21 September – 25 September 2015, St.Petersburg State University, St. Petersburg, Russia), oral presentation.
6. A. A. Gusev, V.P. Gerdt, [S.I. Vinitsky](#), V. L. Derbov, A. Gózdź, and A. Pędrak, “Symbolic algorithm for generating irreducible bases of point groups in the space of $\text{SO}(3)$ group”, [17th International Workshop in Computer Algebra in Scientific Computing](#) (14–18 September 2015, Aachen, Germany), oral presentation
7. A. Gusev, A. Gózdź, [S.I. Vinitsky](#), “Metastable states of clusters tunneling through repulsive barriers”, [Scientific Symposium dedicated to the memory of Professor Stanisław Szpikowski](#) (26 March 2015, University of Maria Curie-Skłodowska, Lublin, Poland), oral presentation.
8. A.A. Gusev, L.L. Hai, O. Chuluunbaatar, V. Ulziibayar, [S.I. Vinitsky](#), V.L. Derbov, A. Gózdź, and V.A. Rostovtsev, “Symbolic-numeric solution of boundary-value problems for the Schrodinger equation using the finite element method: scattering problem and resonance states”, [17th International Workshop in Computer Algebra in Scientific Computing](#) (14–18 September 2015, Aachen, Germany), oral presentation.
9. I. S. Ishmukhamedov “The spectrum of a two-body atomic system in an anharmonic trap”, [International Conference of Students and Young Scientists Farabi’s World](#) (13 – 16 April 2015, Al-Farabi Kazakh National University, Almaty, Kazakhstan), section talk.
10. O. I. Kartavtsev and A. V. Malykh, “Universal description of rotational-vibrational spectrum of three two-component particles with contact interactions”, [LXV International Conference on Nuclear Physics](#) (29 June – 3 July 2015, Peterhof, Saint-Petersburg, Russia), section talk.

11. O.I.Kartavtsev and A.V.Malykh, “Universal description for few two-species particles”, [IV South Africa - JINR Symposium](#) (21 – 25 September 2015, Dubna, Russia), section talk.
12. E. A. Kolganova and A.A.Korobitsin, “Universalities in rare gas three-body systems ”, [The LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (29 June – 03 July 2015, St.Petersburg, Russia), oral talk.
13. E. A. Kolganova, A. A. Korobitsin, and O.P.Klimenko, “The rare gases clusters and some universalities”, [The IX International Symposium on Quantum Theory and Symmetries \(QTS-9\)](#) (13 – 18 July 2015, Yerevan, Armenia), oral presentation.
14. E. A. Kolganova, “Three-body Scattering Processes in Faddeev Approach ”, [International School/Humboldt Kolleg on Symmetry in Integrable Systems and Nuclear Physics](#) (6 – 11 July, 2015, Tsakhkadzor, Armenia), lecture.
15. E. A. Kolganova, “Ultracold Atomic Clusters and Efimov Effect ’, [SKLTP-BLTP Joint Workshop on Physics of Strong Interaction](#) (20 October – 3 November, 2015, Guilin, China), invited talk.
16. E. A. Kolganova, “Three-body systems and Efimov effect”, [4th South Africa - JINR Symposium on Few to Many Body Systems: Models and Methods and Applications](#) (21 – 25 September 2015, Dubna, Russia), invited talk
17. V.N. Kondratyev, “Nuclear magics at explosive magnetization”, [12th International Conference on Nucleus Nucleus Collisions](#) (21–26 June 2015, Catania University, Italy), section talk.
18. V.N. Kondratyev and Y.V. Korovina, “Statistics of magnetar crusts magnetoemission”, [12th International Conference on Nucleus Nucleus Collisions](#) (21–26 June 2015, Catania University, Italy), poster.
19. V.N. Kondratyev, I.V. Kres, I.M. Kadenko, S. Cherubini, and C. Spitaleri, “Coulomb penetration and nuclear transmutations at sub-barrier reactions”, [12th International Conference on Nucleus Nucleus Collisions](#) (21–26 June 2015, Catania University, Italy), poster.
20. I.V. Kres, V.N. Kondratyev, I.M. Kadenko, S. Cherubini, and C. Spitaleri, “Preliminary studies for three experiments at Treiman-Yang criterion”, [12th International Conference on Nucleus Nucleus Collisions](#) (Catania University, Italy, 21–26 June 2015), poster.
21. V.N. Kondratyev, “Magic nuclei at explosive dynamo activity”, [International Conference “Nuclear Structure and Related Topics”](#) (Dubna, Russia, 14 – 18 July 2015), poster.
22. V.N. Kondratyev, “Magics of magnetized nuclei at explosive nucleosynthesis”, [International Conference “Astronomy and Space Physics”](#) (25–29 May 2015, Kiev, Ukraine), oral presentation.
23. V.N. Kondratyev and Y.V. Korovina, “Magnetoemission of magnetar crust”, [IXth International Symposium “Quantum Theory and Symmetries”](#) (13–18 July 2015, Yerevan, Armenia), oral presentation.

24. V. N. Kondratyev and Yu. V. Korovina, “Nuclear magics at magnetorotational supernova explosion” 5-th Odessa International Astronomical Gamow Conference and 15-th School (16–23 August 2015, Odessa, Ukraine), oral presentation.
25. [A. A. Korobitsin](#) and E. A. Kolganova, “The rare gas clusters at low temperatures”, [The IV school–conference of young scientists and specialists of JINR](#) (6 – 13 June 2014, Alushta, Crimea, Russia), oral presentation.
26. [E. A. Koval](#) and O. A. Koval, “Resonances in two-dimensional two-particle system with anisotropic interaction search algorithm”, XIX International Scientific Conference of Young Scientists and Specialists (16–20 February 2015, Dubna, Russia), oral presentation.
27. [O. A. Koval](#) and E. A. Koval, “Numerical integration of the 2D eigenvalue problem: 2D hydrogen atom”, The XIX International Scientific Conference of Young Scientists and Specialists (16–20 February 2015, Dubna, Russia), oral presentation.
28. [O. A. Koval](#) and E. A. Koval, “Numerical integration of the 2D eigenvalue problem: 2D hydrogen atom”, The IV International Scientific School-Conference of Young Scientists and Specialists of JINR (06 – 13 June 2015, Alushta, Crimea, Russia), oral presentation.
29. V. S. Melezhik, “Mathematical modeling of ultracold few-body processes in atomic traps”, International Conference on Mathematical Modeling and Computational Physics (13–17 July 2015, Stará Lesná in High Tatra Mountains, Slovakia), plenary lecture.
30. V. S. Melezhik, “Ultracold resonant processes in 1D and 2D atomic traps”, [The LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (29 June – 03 July 2015, St.Petersburg, Russia), section talk.
31. V. S. Melezhik “Ultracold resonant processes in atomic and molecular traps”, [Brasil-JINR Forum: Frontiers in Nuclear, Elementary Particle and and Condensed Matter Physics](#) (15–19 June 2015, Dubna, Russia), oral presentation.
32. V. S. Melezhik “Ultracold resonant processes in atomic traps”, 4th South Africa – JINR Symposium “Few to Many Body Systems: Models and Methods and Applications” (21–25 September 2015, Dubna, Russia), oral presentation.
33. V. S. Melezhik, “Shifts and widths of magnetic Feshbach resonances in atomic traps”, International Conference on Precision Physics and Fundamental Physical Constants (12–16 October 2015, Budapest, Hungary), invited talk.
34. V. S. Melezhik and A. Negretti, “Atom-ion confinement-induced resonances”, Workshop on Hybrid Atomic Quantum Systems (28–30 September 2015, Hamburg, Germany), poster.
35. A.K. Motovilov, “Block diagonalization of J -self-adjoint operators and resonances”, [Fourth Najman Conference on Spectral Problems for Operators and Matrices](#) (20–25 September 2015, Opatija, Croatia), oral presentation
36. A.K. Motovilov, “Bounds on rotation of the spectral subspaces of a few-body Hamiltonian”, [The LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (29 June – 03 July 2015, St.Petersburg, Russia), section talk.

37. A.K. Motovilov, “Upper bounds on variation of spectral subspaces of a Hermitian operator”, [Brasil-JINR Forum: Frontiers in Nuclear, Elementary Particle and Condensed Matter Physics](#) (15–19 June 2015, Dubna, Russia), oral presentation.
38. Yu.V. Popov, “New look at the strong field approximation in laser-matter interactions”, [International Symposium on \(e,2e\), Double Photo-Ionization and Related Topics](#) (30 July – 1 August 2015, San Sebastian, Spain) (section talk).
39. Yu.V. Popov, K.A. Kouzakov, A.A. Bulychev, S.I. Vinitsky, “Theory of quasielastic laser - assisted atomic reactions”, [The LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (29 June – 03 July 2015, St.Petersburg, Russia), section talk.
40. V. V. Pupyshev, “Modeling of quasi-two-dimensional collision of hydrogen atoms”, [Third International Conference “Modeling of Non-Linear Processes and Systems”, MNPS-2015](#) (22–26 June 2015, Moscow), oral presentation.
41. D. S. Valiolda, “Study of ultracold atomic systems in optical trap”, [XIX International Scientific Conference of Young Scientists and Specialists](#) (16–20 February 2015, Dubna, Russia), poster.
42. D. S. Valiolda, I. S. Ishmukhamedov, S. A. Zhaugasheva, “Theoretical study of atomic systems in harmonic optical trap”, [9th APCTP – BLTP JINR Joint Workshop: Modern Problems of Nuclear and Elementary Particle Physics](#) (27 June – 4 July 2015, Almaty, Kazakhstan), poster.
43. S.I.Vinitsky, “Quantum tunneling of a diatomic molecule through barriers”, [IX International Symposium on Quantum Theory and Symmetries](#) (13–18 July 2015, Yerevan, Armenia), oral presentation.
44. S. Vinitsky, “Resonant tunneling of composite systems through repulsive barriers”, [42nd Meeting of JINR PAC for Nuclear Physics](#) (4–5 June 2015, Dubna, Russia), oral presentation.
45. S. Vinitsky, “Resonance tunneling of composite systems through repulsive barriers”, [The 9th APCTP-BLTP JINR Joint Workshop Modern problems in Nuclear and Elementary Particle Physics](#) (27 June – 4 July 2015, Almaty, Kazakhstan), oral presentation.
46. S.I.Vinitsky, “Tunneling of composite particles through repulsive barriers”, [4th South Africa - JINR Symposium “Few to Many Body Systems: Models and Methods and Applications”](#) (21–25 September 2015, Dubna, Russia), oral presentation.
47. S.I. Vinitsky, A.A. Gusev, O. Chuluunbaatar, V.L.Derbov, and A.S. Zotkina, “On calculations of two-electron atoms in spheroidal coordinates mapping on hypersphere”, [Saratov Fall Meeting’15 – International Symposium on Optics and Biophotonics-III](#) (22–25 September 2015 Saratov, Russia), poster.

3.6 Seminar talks

1. A.A. Bulychev, “Laser-assisted electron momentum spectroscopy of light atoms and molecules (based on materials of a C.Sc. thesis)”, (10 February 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
2. T. P. Grozdanov and E. A. Solov’ev, “Dynamical adiabatic theory of atomic collisions: Charge exchange in collisions of He^{2+} with $\text{H}(1s)$ ” (14 September 2015, Seminar on Nuclear Theory BLTP, JINR, Dubna).
3. O.I. Kartavtsev and A.V. Malykh, “Universal description of rotational-vibrational spectrum of three two-component particles with contact interactions”, (14 April 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
4. A. A. Korobitsin and E. A. Kolganova, “The rare gas clusters and universalities” (14 April 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
5. V. S. Melezhik, “From muon-catalyzed fusion to cold atoms” (17 March 2015, Laboratory seminar, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
6. A.K. Motovilov, “Bounds on on rotation of spectral subspaces” (27 February 2015, Seminar “Operator Models in Mathematical Physics”, at the Department of Mechanics and Mathematics of Moscow Lomonosov State University).
7. A.K. Motovilov, “Bounds on rotation of the spectral subspaces of a few-body Hamiltonian” (14 April 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
8. V.V. Pupyshv, “Two-dimensional Coulomb scattering of a quantum particle: The wavefunctions and Green functions” (24 February 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).
9. V.V. Pupyshv, “Two-dimensional Coulomb scattering of a quantum particle: The low-energy asymptotics” (3 March 2015, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).

4 Visits

4.1 Conferences, schools

1. A. A. Bulychev, “[XXIX International Conference on Photonic, Electronic and Atomic Collisions](#)” (Toledo, Spain), 22.07.2015–28.07.2015.
2. A. A. Bulychev, “[Saratov Fall Meeting 2015](#)” (Saratov, Russia), 22.09.2015–25.09.2015.
3. I. S. Ishmukhamedov, International Conference of Students and Young Scientists “[Farabi’s World](#)” (Al-Farabi Kazakh National University, Almaty, Kazakhstan), 13.04.2015–16.04.2015.
4. D. M. Janseitov, “[Euroscool on Exotic Beams 2015](#)” (Dubrovnik, Croatia), 30.08.2015–06.09.2015.

5. D. M. Janseitov, “Nuclear Physics in Astrophysics Conference (NPA VII)” (York, UK), 18.05.2015–22.05.2015.
6. E. A. Kolganova, [The LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (St.Petersburg, Russia), 29.06.2015 – 03.07.2015.
7. E. A. Kolganova, [International School/Humboldt Kolleg on Symmetry in Integrable Systems and Nuclear Physics](#) (Tsakhkadzor, Armenia), 06.07.2015 – 11.07.2015.
8. E. A. Kolganova, [The IX International Symposium on Quantum Theory and Symmetries \(QTS-9\)](#) (Yerevan, Armenia), 13.07.2015 – 18.07.2015.
9. E. A. Kolganova, [Advanced Studies Institute “Symmetries and Spin” \(SPIN-Praha-2015\)](#) (Prague, Czech Republic), 26.07.2015–01.08.2015.
10. E. A. Kolganova, [Advanced students physics training course](#) (Prague, Czech Republic), 26.07.2015–31.07.2015.
11. E. A. Kolganova, [VI International Pontecorvo Neutrino Physics School](#) (Horný Smokovec, Slovakia), 27.08.2015–04.09.2015.
12. E. A. Kolganova, [SKLTP-BLTP Joint Workshop on Physics of Strong Interaction](#) (Guilin, China), 20.10.2015 – 3.11.2015.
13. A. A. Korobitsin, [The IV school-conference of young scientists and specialists of JINR](#) (Alushta, Crimea, Russia), 06.06.2015–13.06.2015.
14. E. A. Koval, [The IV school-conference of young scientists and specialists of JINR](#) (Alushta, Crimea, Russia), 06.06.2015–13.06.2015.
15. O. A. Koval, [The IV school-conference of young scientists and specialists of JINR](#) (Alushta, Crimea, Russia), 06.06.2015–13.06.2015.
16. A. V. Malykh, [LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (Peterhof, Saint-Petersburg, Russia), 29.06.2015–03.07.2015.
17. V. S. Melezhik, [LXV International Conference on Nuclear Physics \(Nucleus 2015\)](#) (Peterhof, Saint-Petersburg, Russia), 29.06.2015–03.07.2015.
18. V. S. Melezhik, [International Conference Mathematical Modeling and Computational Physics, MMCP 2015](#) (Stará Lesná in High Tatra Mountains, Slovakia), 13.07.2015-17.07.2015.
19. V. S. Melezhik, [Workshop on Hybrid Atomic Quantum Systems](#) (Hamburg, Germany), 28.09.2015–30.09.2015.
20. V. S. Melezhik, [International Conference on Precision Physics and Fundamental Physical Constants, FFK–2015](#) (Budapest, Hungary), 12.10.2015–16.10.2015.
21. A.K. Motovilov, [Fourth Najman Conference on Spectral Problems for Operators and Matrices](#) (Opatija, Croatia), 20.09.2015–25.09.2015.

22. A.K. Motovilov, LXV International Conference on Nuclear Physics (Nucleus 2015) (Peterhof, Saint-Petersburg, Russia), 29.06.2015–03.07.2015.
23. Yu.V. Popov, International Symposium on (e,2e), Double Photo-Ionization and Related Topics (San Sebastian, Spain), 30.07.2015–01.08.2015.
24. Yu.V. Popov, LXV International Conference on Nuclear Physics (Nucleus 2015) (Peterhof, Saint-Petersburg, Russia), 29.06.2015–03.07.2015.
25. V. V. Pupyshev, [Third International Conference “Modeling of Non-Linear Processes and Systems”](#), MNPS-2015 (Moscow, Russia) 22.06.2015–26.06.2015.
26. E. A. Soloviev, [International Conference “Models in Quantum Field Theory”](#) dedicated to A.N.Vasiliev (St.Petersburg, Russia), 21.09.2015–25.09.2015.
27. D. S. Valiolda, 9th APCTP–BLTP JINR Joint Workshop “Modern problems of nuclear and elementary particle physics” (Almaty, Kazakhstan), 27.06.2015–04.07.2015.
28. S.I.Vinitsky, IX International Symposium on Quantum Theory and Symmetries (Yerevan, Armenia), 13.07.2015–18.07.2015.
29. S.I.Vinitsky, 9th APCTP–BLTP JINR Joint Workshop “Modern problems of nuclear and elementary particle physics” (Almaty, Kazakhstan), 27.06.2015–04.07.2015.
30. S.I.Vinitsky, 17th International Workshop in Computer Algebra in Scientific Computing (Aachen, Germany), 14.09.2015–18.09.2015.
31. S.I.Vinitsky, Saratov Fall Meeting’15 – International Symposium on Optics and Biophotonics-III (Saratov, Russia), 22.09.2015–25.09.2015.

4.2 Collaboration visits

1. I. S. Ishmukhamedov, Al-Farabi Kazakh National University, Almaty, Kazakhstan, 26.01.2015–17.05.2015.
2. I. S. Ishmukhamedov, Al-Farabi Kazakh National University, Almaty, Kazakhstan, 10.08.2015–05.10.2015.
3. S. S. Kamalov, Institute of Nuclear Physics, Mainz University, Mainz, Germany, 19.08.2015–19.09.2015.
4. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 11.05.2015–21.05.2015.
5. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 04.09.2015–12.09.2015.
6. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 03.12.2015–15.12.2015.

7. V. S. Melezhik, Center of Quantum Optics, Physics Department, University of Hamburg, Hamburg, Germany, 17.01.2015 - 25.01.2015.
8. V. S. Melezhik, Center of Quantum Optics, Physics Department, University of Hamburg, Hamburg, Germany, 27.09.2015 - 04.10.2015.
9. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 15.07.2015–24.07.2015.
10. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 25.11.2015–01.12.2015.
11. Yu.V. Popov, Université Catolique de Louvain, Louvain-la-Neuve, Belgium, 15.04.2015–14.05.2015.
12. Yu.V. Popov, Université Catolique de Louvain, Louvain-la-Neuve, Belgium, 10.11.2015–09.12.2015.
13. D. S. Valiolda, Kazakh National University, Almaty, Kazakhstan, 24.02.2015–03.04.2015.
14. D. S. Valiolda, Kazakh National University, Almaty, Kazakhstan, 26.10.2015–18.12.2015.
15. S. I. Vinitzky, University of Maria Curie-Sklodowska, Lublin, Poland, 23.03.2015–03.04.2015.
16. S. I. Vinitzky, University of Maria Curie-Sklodowska, Lublin, Poland, 12.10.2015–24.10.2015.

5 Visitors

1. Andrzej Gózdź, Maria Curie-Sklodowska University, Lublin, Poland 07.06.2015–19.06.2015.
2. Tasko Grozdanov, Institute of Physics, Belgrade, Serbia, 24.05.2015–04.06.2015.
3. Tasko Grozdanov, Institute of Physics, Belgrade, Serbia, 13.09.2015–26.09.2015.
4. Mats Larsson, Physics Department, Stockholm University, Stockholm, Sweden, 29.09.2015–30.09.2015.
5. Anastasya Lebedeva, Institute of Nuclear Physics, Almaty, Kazakstan, 30.09.2015–07.10.2015.
6. Sergey B. Levin, St. Petersburg State University, St. Petersburg, Russia, 29.09.2015–30.09.2015.
7. Johan Otto, University of Pretoria, South Africa, 05.03.2015–23.03.2015.

8. Alexandra Peđrak, Maria Curie-Skłodowska University, Lublin, Poland
07.06.2015–19.06.2015.
9. Sergey A. Rakityansky, University of Pretoria, South Africa, 21.08.2015–30.09.2015.
10. Sara Shadmehri, Institute for Advanced Studies in Basic Sciences, Zanjan, Iran, 03.02.2015–29.12.2015

6 Teaching

1. E.A. Kolganova: PhD adviser of A. Korobitsin, UNC JINR, Dubna.
2. E.A. Kolganova: PhD adviser of O. Klimenko, Univeristy Dubna.
3. E.A. Kolganova: Diploma adviser of N. Korshunova (master thesis), student of Dubna University, Dubna.
4. E.A. Kolganova: Diploma adviser of E. Mardyban (bachelor diploma), student of Dubna University, Dubna.
5. E.A. Kolganova: Diploma adviser of V. Shalaev (bachelor diploma), student of Dubna University, Dubna.
6. E.A. Kolganova: Diploma adviser of I. Zhizhin (bachelor diploma), student of Dubna University, Dubna.
7. E.A. Kolganova: Dozent of the Dubna University, lecture course “Mathematical modeling and numerical methods” (February–June and September–December, 2015).
8. E.A. Koval: seminars for first-year students “Physics of macrosystems”, Dubna University.
9. V. S. Melezhik: [three video-lectures](#) for the internet journal [PostNauka](#).
10. V. S. Melezhik: Professor of the Dubna University, lecture course “General physics”(all the academic year), lecture course “Modern problems and methodology of physics” (September–December 2015).
11. V. S. Melezhik: Ph. D. Thesis adviser of E.A. Koval, Ph. D. student of Dubna University, Dubna.
12. V. S. Melezhik: Ph. D. Thesis adviser of O.A. Koval, Ph. D. student of JINR University Center, Dubna.
V. S. Melezhik: Ph. D. Thesis adviser of I. Ishmukhamedov, Jr.Sc. of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP, JINR, Dubna.
V. S. Melezhik: Ph. D. Thesis adviser of D. Valiolda, Jr.Sc. of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP, JINR, Dubna.
V. S. Melezhik: Ph. D. Thesis adviser of D. Dzhanseitov, Jr.Sc. of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP, JINR, Dubna.

13. A. K. Motovilov: Professor of the Dubna University, lectures and seminars on the course “Scattering theory for few-body systems” for 5th and 6th year students (September – December 2015).
14. Yu.V. Popov, co-adviser of A.Galstyan, Ph.D student of the Université Catholique de Louvain, Louvain-la-Neuve, Belgium.
15. D.S. Valiolda, seminars for the course “Introduction to physics of elementary particles and atomic nuclei” at the Faculty of Physics and Technology, Al Farabi Kazakh National University, (Almaty, Kazakhstan), 25.02.2015–02.04.2015.

7 Organizational activity

1. E. A. Kolganova: Member of the [BLTP NTS](#).
2. E. A. Kolganova: Scientific Secretary of the [JINR NTS](#).
3. E. A. Kolganova: Scientific Secretary of the Council for conferring of bachelor and master degrees at the Theoretical Physics Department, Dubna University.
4. E. A. Kolganova, Scientific Secretary [International School/Humboldt Kolleg on Symmetry in Integrable Systems and Nuclear Physics](#) (6 – 11 July, 2015, Tsakhkadzor, Armenia).
5. E. A. Kolganova: Scientific Secretary, [Advanced Studies Institute on Symmetries and Spin](#) (26 July – 01 August 2015, Prague, Czech Republic).
6. E. A. Kolganova, Member of Organizing Committee [The IX International Symposium on Quantum Theory and Symmetries \(QTS-9\)](#) (13 – 18 July, 2015, Yerevan, Armenia).
7. E. A. Kolganova, Member of Organizing Committee [The Helmholtz International Summer School “Dense Matter 2015”](#) (29 June – 11 July, 2015, BLTP JINR).
8. E. A. Kolganova, Member of Organizing Committee [South Africa-JINR Round Table “Physics at NICA”](#) (06 June – 11 July, 2015, VBLHE JINR).
9. E. A. Kolganova, Coordinator of [the 15th International conference on Strangeness in Quark Matter\(SQM-2015\)](#) (05 June, 2015, VBLHE JINR).
10. E. A. Kolganova, Member of Organizing Committee [The XVIth International workshop on High Energy Spin Physics \(DSPIN-15\)](#) (08 – 12 September, 2015, BLTP JINR).
11. E. A. Kolganova, Member of Organizing Committee [VI International Pontecorvo Neutrino Physics School](#) (27 August - 04 September, 2015, Horny Smokovec, Slovakia).
12. E. A. Kolganova, Member of Organizing Committee [IV South Africa - JINR Symposium "Few to Many Body Systems: Models and Methods and Applications"](#) (21 – 25 September, 2015, BLTP JINR).
13. E. A. Kolganova: Support of the [BLTP Website](#).

14. V. N. Kondratyev: Member of Editorial Board of the [International Journal of Astronomy and Astrophysics](#).
15. V. N. Kondratyev: Member of Editorial Board of the [International Journal of Advanced Astronomy](#).
16. V. N. Kondratyev: Member of Editorial Board of “[Research and Applications in Astronomy](#)”.
17. O. A. Koval: Chairperson of the Organizing Committee of the IV school–conference of young scientists and specialists of JINR (6 – 13 June 2015, Alushta, Crimea, Russia).
18. O. A. Koval: Co-Chairperson of Organizing Committee of [The XIX International Scientific Conference of Young Scientists and Specialists](#) (16 – 20 February 2015, Dubna, Russia).
19. O. A. Koval: Co-Chairperson of Organizing Committee of [Summer School-Conference on Physics for Teachers and Pupils, Students, Graduate Students, Young Scientists and Specialists](#) (01 – 08 August 2015, Dubna, Russia).
20. O. A. Koval: Assistance in organizing [Basil–JINR Forum](#) (15 –19 June 2015, Dubna, Russia) and [4th South Africa–JINR Symposium](#) (21 – 25 September 2015, Dubna, Russia).
21. O. A. Koval: Member of the JINR Youth Commission.
22. O. A. Koval: Member of the Public Council of the JINR Directorate for Cooperation with the local self Dubna.
23. O. A. Koval: Member of the commission on modernization of common social and engineering infrastructure of JINR.
24. O. A. Koval: A member of the Public Council of the JINR Directorate on Cooperation with local authorities of Dubna.
25. A. V. Malykh: Secretary of the BLTP Seminar on Few-Body Systems.
26. V. S. Melezhik: Member of the D. Sc. Panel of LIT JINR.
27. V.S. Melezhik: Federal expert of Russian Ministry of Education and Science (ГБНУ НИИ РИНКЦЭ, Свидетельство №04-05381 от 27.02.2014).
28. V. S. Melezhik: Member of the BLTP Expert commission.
29. V. S. Melezhik: Member of the International Program Committee of the International Conference Mathematical Modeling and Computational Physics, MMCP 2015 (13–17 July 2015, Stará Lesná in High Tatra Mountains, Slovakia).
30. V. S. Melezhik: Member of the Jury of the 19th International Scientific Conference of Young Scientists and Specialists of JINR (16–20 February 2015, Dubna, Russia).
31. A. K. Motovilov: Convener of Few-Body Systems section at the [IV South Africa– JINR Symposium](#) (21–25 September 2015, Dubna, Russia).

32. A. K. Motovilov: Member of Editorial Board of the “Few-Body Systems” journal.
33. A. K. Motovilov: Member of the BLTP NTS.
34. S. I. Vitsky: Member of Organizing Committee, The IX International Symposium on Quantum Theory and Symmetries (July 13-18, 2015 Yerevan, Armenia).
35. S. I. Vitsky: Member of Organizing Committee, Saratov Fall Meeting'15 – International Symposium on Optics and Biophotonics-III (September 22-25, 2015 Saratov, Russia).

8 Awards, prizes, thesis defences, etc.

1. A. A. Bulychev: Defence of the Ph.D. thesis.